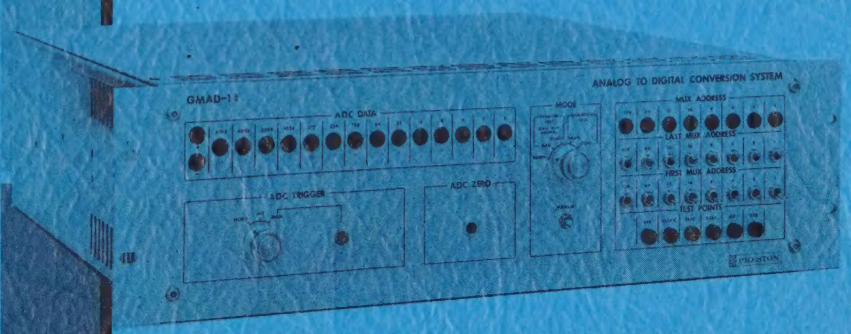
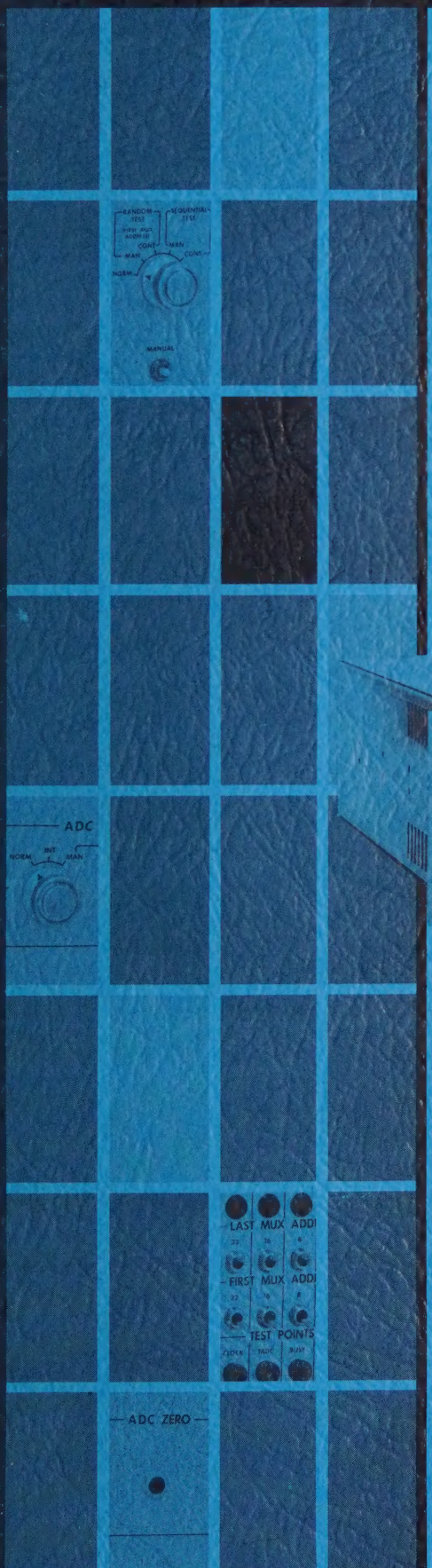
GM SERIES

ANALOG-TO-DIGITAL CONVERSION SYSTEMS





PRESTON

GM SERIES

ANALOG-TO-DIGITAL

CONVERSION SYSTEM

SYSTEM PART NUMBER 58855

System Part Number 58855 Consists of.....

PART NUMBER 58700-03 A/D CONVERSION SYSTEM

and

PART NUMBER 58845 MULTIPLEXER EXPANDER

System of Record.....

PART NUMBER 58700-03 SERIAL NUMBER RAA-871

PART NUMBER 58848 SERIAL NUMBER RAA-872

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7133	CHANGED MANUAL TITLE PAGE TO REFLECT THE TOTAL SYSTEM DESCRIPTION

INTRODUCTION

This document contains instructions for the operation and maintenance of the Preston GM Series Product noted on the title page.

The part number which describes this unit is located on the rear panel of the instrument. In addition, each unit is assigned a serial number unique to the particular piece of hardware to which it is attached. These numbers describe this instrument completely and should be referred to in all correspondence.

A complete replacement parts list is included in this manual, along with all drawings and schematics pertaining to the unit. The minimum spare parts order is $25.00. Prices quoted in the parts list are subject to change without notice.

Should the system need to be returned to Preston for repair or rework, the item should be sent to the Anaheim plant-- Attention: Customer Service-- and the shipping prepaid. Also, include reasonably complete information concerning the nature of the failure or your reason for the return of the equipment.

Our Address Is: PRESTON SCIENTIFIC INC.
805 East Cerritos Avenue
Anaheim California 92805

Our Telephone No. Is: (714) 776-6400

Our Telex No. Is: 65-5321

INTRODUCTION

SECTION 1

SYSTEM INTERFACE AND CONTROL

BASIC OPERATION INSTRUCTIONS

The Preston Analog-to-Digital Conversion System has a power requirement of 110-220 volts AC 50-60 Hz. The prime power requirement is customer specified and is noted both in the drawing section and the test report.

The GM System card modules are designed to be mounted into a standard 19-inch RETMA relay rack. To prevent damage to the front panel, nylon filler washers should be placed under the rack mounting screws. For correct weight distribution, drawer slides must be used for support. The unit has an integral fan. The ambient air should be maintained at less than 50 degrees centigrade.

Unless otherwise specifies the prime power is controlled by a rear panel ON-OFF switch and fuse. The value of the fuse is noted on the rear panel and also in the parts list.

ANALOG INPUT TERMINATIONS

Two types of multiplexers are employed by the GM Series System. The Model GMM is normally used for single-ended multiplexing applications. Some systems are configured using two GMM switches on each channel to provide a differential multiplexing capability.

The Model GMD series Amplifier-Multiplexer provides a differential amplifier per channel multiplexer capability for applications which demand intra-channel isolation. The Model GMD may be operated single-ended or differential depending upon the requirements of the customer.

SINGLE-ENDED INPUT MODEL GMM

When the Model GMM Multiplexer is used for single-ended applications, the input signal is connected between the channel input and analog ground (shield). The rear connector provides terminations for both of these connections for each channel. Please refer to the customer connection drawing in Section 11 and to the source and/or input impedance specifications for the multiplexer.

DIFFERENTIAL INPUT MODEL GMM

Differential input using the GMM Multiplexer is accomplished by using a pair of single-ended input multiplexer switches on each channel (please refer to the customer connection drawing for input termination pin

locations). You will note upon referring to the customer connection drawing, that the differential input is carried on three wires HI, LO, and SHIELD. The shield is not electrically terminated at the multiplexer switch, but does physically surround the input circuitry. The SHIELD must be referenced to the common mode source. The impedance between the HI or LO wires and multiplexer ground must not exceed the allowable specified source impedance of the multiplexer.

DIFFERENTIAL INPUT MODEL GMD

The input to the Model GMD Multiplexer is designed to be either differential or single-ended. The differential input uses a three terminal input, i.e. HI, LO and SHIELD, and all terminations are available at the rear connector. The SHIELD is not connected internally but does physically surround the input section of the multiplexer channel. The SHIELD must, however, be referenced to the Common Mode Source. The impedance between the HI or LO wires and GMD ground must not exceed 10 megohms.

DIGITAL INPUT AND OUTPUT LINE TERMINATIONS

INPUT CONTROL AND DATA LINE TERMINATIONS

Input Control Line and Input Digital Data Line receiving devices are normally TTL Logic 74 Series integrated circuits. These lines are normally not internally terminated and for this reason, we recommend series termination resistors of 33 ohms at the driving end as shown in Figure 90000.

Optional differential line receivers may be employed per customer requirement in which case the normal configuration appears in Figure 90001. The Line Receivers used in the configuration are Texas Instrument 75 Series.

OUTPUT CONTROL AND DATA LINE TERMINATIONS (Figure 90002)

The logic used as drivers for the output digital control lines are TTL 74 Series integrated circuits. These lines are internally provided with a 33 ohm resistor per line and are designed to drive a 50 ohm coaxial cable, typically either #RG174U or #RG58U.

Optional differential line drivers may be employed per customer requirement in which case the normal configuration appears in Figure 90003. The line drivers used in the configuration are Texas Instruments 75 Series.

COMMON MODE AND DIFFERENTIAL DRIVERS AND RECEIVERS

Leakage currents which are generated in the differential line receiver as noted in Figure 90004 must be returned to the power supply ground of the receiver. In Figure 90004, it will be noted that if point "X" at the receiver is not tied to its power ground, the leakage current has no path for return at the receiver end. This will cause some voltage to appear across resistance "R". If this voltage exceeds the common mode voltage limitations of the device, it will fail to operate properly. To prevent this common mode voltage from exceeding this limit, the resistance "R" is recommended to be less than 1K ohm.

In most systems there are line drivers and receivers communicating in both directions (between system and A to D). The ground return technique mentioned in the above paragraph is accomplished in the customers equipment. As indicated in Figure 90005, the power ground of the Driver "A" is connected to the power ground at Receiver "B" (point X1 to ground) at the customer side of the system. This connection is made via the resistance "R" (less than 1K ohm) and provides return for both Preston and customer receiver.

SYSTEM CONTROL

Control of the MUX/ADC System may be accomplished by any one of the following methods.

ALL EXTERNAL CONTROL (without optional GMC Logic Control Package)

Control signal input connections are provided for (1) binary channel address, no storage, (2) Sample-and-Hold commands (when applicable) and (3) Direct Trigger ADC (DTADC). When this method of control is used, all operations of the MUX/ADC combination are controlled by external means, all necessary settling times must be observed, and the channel addressing must not change during the conversion process.

A timing diagram is supplied in Section 12 and contains the necessary information for the specific control signals and their proper timing sequence.

CONTROL USING AN EXTERNAL CLOCK (with optional GMC Logic Control)

For a complete description of the optional GMC Logic Control, refer to Section 3 of this Manual.

The optional GMC Logic Control Package permits the system to be operated in the external mode by either of the following two methods. In the external (NORMAL) Mode, a channel may be randomly addressed. When the ADD-X signal is HI, initiation of a CLOCK pulse will select

the desired channel, and after the proper delays, will command the ADC to start the conversion process. No external Direct TADC is required. Also in the external mode (NORMAL), the front panel select switches of the GMC Control Logic are used to establish the first and last channels of a sequence of channels. When the ADD-X signal is LO and each clock pulse is received (externally provided), the next channel in sequence will be selected, followed by an automatic initiation of the conversion process. No external Direct TADC is needed in this mode.

SYSTEM CONTROL (with GMC Logic Control Package)

The following are some of the methods for system control via the Front Panel.

(a) Repetitious selection and conversion of the same channel by:

>>> placing the First MUX Address Switches on the desired channel

>>> placing the Mode Switch in RANDOM/MAN

>>> pressing the Manual Pushbutton (Multiplexer Control)

>>> placing the ADC/TRIGGER in INT (Internal).

As a result of the aforegoing 'set-up' the ADC will repetitively digitize the selected channel at a rate governed by the ADC Internal Clock (usually to 10 Hz).

(b) Repetitious conversion of the same channel may also be accomplished by:

>>> placing the Mode Switch in RANDOM/CONT (continous)

>>> placing the First MUX Address switches in the desired channel

>>> placing the ADC/trigger in the NORMAL position

As a result of this 'set-up', the ADC will repetitively digitize the selected channel at a rate governed by the Multiplexer Clock (usually at the maximum repetition rate of the converter/multiplexer combination).

(c) Repetitious conversion of the same channel 'manually' is accomplished by:

>>> placing the First MUX Address switches on the desired channel

>>> placing the Mode Switch in the RANDOM/MAN position

>>> pressing the Manual Pushbutton (Multiplexer Control)

>>> placing the ADC/Trigger in MAN

In the preceding configuration, the ADC will digitize the selected channel each time the Manual pushbutton (ADC Control) is depressed.

(d) Sequential selection and conversion of a series of channels manually by:

>>> placing the mode Front Panel Switch in SEQUENTIAL/MAN position

>>> placing the First MUX Address switches to the first channel desired

>>> placing the Last MUX Address switches to the last channel desired

>>> placing the ADC/trigger in the NORMAL position

In this 'set-up' pressing the Manual button (Multiplexer Control) will select each channel one at a time and convert that channel.

(e) Sequential selection and conversion of a series of channels

automatically by:

>>> placing the Mode Switch in the SEQUENTIAL/CONTINUOUS position

>>> placing the First MUX Address switches to the first channel desired

>>> placing the Last MUX Address switches to the last channel desired

>>> placing the ADC/Trigger in the NORMAL position

The preceding allows the control system to advance through and convert each channel in sequence at a rate governed by the multiplexer control clock (usually at the maximum repetition rate of the Multiplexer/ADC combination).

SAMPLE-AND-HOLD CONTROL LOGIC

Each one of the sample-and-hold boards has its own control logic. The logic diagram is pictured in Figure 90006. Refer to the chart in Figure 90007 for the different ways to control the sample-and-hold modes and their subsequent logic connections.

Common types of control are:

(a) A pulse on the sample line to obtain the sample mode, and a pulse on the hold line to obtain the hold mode

(b) Single line drive sample logic line

(c) Single line drive, hold logic line, true for hold, false for

sample.

SECTION 2

MULTIPLEXER

MODEL GMM

FUNCTIONAL DESCRIPTION (Figure 90008)

The GMM Multiplexer is a single-ended input/single-ended output semiconductor device. Some systems use this device as a differential multiplexer by using a pair of GMM Multiplexer switches for each differential channel involved, followed by either a differential buffer or Sample-and-Hold Amplifier.

Figure 90008 is an over-all block diagram of the GMM Multiplexer in a system application. Analog input signals are connected to the multiplexer channels from the rear connectors by shielded cabling. Each multiplexer circuit board contains four multiplexer switches, associated switch drive control logic, and analog overload clamps. Control of the multiplexer may be directed from the front panel optional GMC Logic Control Package (see Section 3 and Figure 90008) or by the customer interface at the rear panel connectors (refer Section 1).

SPECIFICATIONS

TYPE: Single-ended SPST

CHANNEL SELECTION: Selection by random address, sequential or any combination of both, when the GMC Logic Control Package is employed.

SWITCHING TIME: Less than 1 microsecond.

ACCURACY: 0.01%

INPUT IMPEDANCE: Greater than 50 megohms.

CROSSTALK: Between channel crosstalk is less than 0.01% of full scale

LINEARITY: 0.01% of full scale.

ZERO DRIFT: Less than +/-1.0 millivolt.

LOGIC LEVELS: Either positive or negative true.

tied to the Drain of the FET and the output of the unity gain amplifier is tied to the Gate of the FET. This added circuit increases the slewing rate of the FET Gate.

The multiplexer switch and its unity gain amplifier appear in block diagram form in Figure 90011.

SPECIFICATIONS MODEL GMD-1

AMPLIFIER TYPE : Direct coupled fixed gain

GAIN: The gain of the amplifier is fixed single gain between 1 and 5 for the Model GMD-1 and at one-tenth (0.1) for the Model GMD-01.

GAIN ACCURACY: +/-0.01% of full scale

GAIN STABILITY: +/-0.01% of full scale for six months at the same temperature

GAIN TEMPERATURE COEFFICIENT : Less than +/-0.002% per degree C

GAIN TRIM: Permits adjustment to within 0.01%, resolution is 0.005% or better.

DC LINEARITY: Maximum deviation +/-0.01% of full scale.

ZERO STABILITY: Short term +/-0.5 millivolts RTO (Relative to Output) for 48 hours at the same temperature.

ZERO TEMPERATURE COEFICIENT: +/0.05 millivolts RTO per degree C

ZERO TRIM: A zero offset adjustment is provided with resolution of 0.1 millivolts.

INPUT IMPEDANCE: 100 megohms for the Model GMD-1, 100 k ohm for the Model GMD-01.

SHUNTING CAPACITANCE: 100 picofarads.

COMMON MODE REJECTION: 80 dB from DC to 60 Hz.

COMMON MODE VOLTAGE:* 10 volts peak AC or DC for balanced inputs, 5 volts peak for signal-ended inputs.

PUMPOUT CURRENT: 10 picoamps nominal.

INPUT CONNECTION: Requires only three wires: Input High, Input Low and Guard.

INPUT OVERLOAD RECOVERY:* The amplifier will recover from an overload of two times full scale to within +/-0.05% of full scale in less than 200 microseconds. Recovery time of the amplifier increases proportionately as the bandwidth decreases (i.e., at 1 kHz, recovery time is 2 milliseconds).

OUTPUT MULTIPLEXED:** Commutated +/-10 volts full scale.

OUTPUT IMPEDANCE-ON: 500 ohms maximum.

OUTPUT LEAKAGE CURRENT-OFF: 15 nanoamps maximum.

CROSSTALK: 0.01% of full scale maximum for 100 channels.

SWITCHING TIME: 1 microsecond to 0.01% of full scale into a load of 10 megohms shunted by 500 pf (analog bus should be guarded and driven externally if wiring capacity exceeds 500 pf or if insulation exhibits dielectric absorption).

FAULT CONDITION: The multiplexer switch is protected against fault condition of the amplifier.

BANDWIDTH: Less than 3 dB down at 1 MHz at 10 volts peak-to-peak.

OPTIONAL FILTER: Any fixed bandwidth from 10 Hz to 1 MHz.

SETTLING TIME: 2.0 microseconds maximum to within 0.01% of final value +/-10 microvolts RTI at 1 MHz. Settling time of the amplifier increases proportionately as the bandwidth decreases (i.e. at 1 kHz, settling time is 2 milliseconds).

NOISE CHARACTERISTICS: Output noise is less than 1.0 millivolts peak-to-peak, typically 0.5 millivolts peak-to-peak.

*The voltage levels referenced in these specifications should be multiplied by 10 when applied to the GMD-01 Amplifier-Multiplexer.

**A direct Output of the GMD Amplifier is available upon special request. This output is electronically located before the MUX Switch

input.

OPERATING INSTRUCTIONS MODEL GMD-1

The System Multiplexer may be totally controlled by the customer or may be controlled by the Optical GMC Logic Control Package. A description of these control methods appear in Sections 1 and 3 of this manual.

THEORY (Figure 90081) MODEL GMD-1

The Multiplexer Switch is a Field Effect Transistor (FET). Figure 90081 shows the channel address circuit and the FET switch circuit. Because the FET has no inherent offset voltage, whatever signal is on the input will also appear on the output (when the switch is ON). One characteristic of the FET used in the Model GMD Amplifier Multiplexers is that it is normally ON with ZERO GATE voltage and is turned OFF by application of a voltage having negative polarity.

Also shown in Figure 90081, the output of the GMD Amplifier is connected to the DRAIN (D) and the multiplexer output is connected to the SOURCE(S) of the FET. When the GATE is released from its negative potential and assumes the potential of the DRAIN, the FET will turn ON and the SOURCE will be brought to the potential of the DRAIN.

The Multiplexer Switch and its input amplifier appear in block diagram form in Figure 90082.

CALIBRATION MODEL GMD-1

COMMON MODE ADJUSTMENT

(a) Tie the input HI and input LO together.

(b) Apply a 20 volt, 60 Hz, AC signal between the tied-together inputs and ground.

(c) Observe the test point marked AMP OUT. Adjust the CM potentiometer for minimum output (20 millivolt scale).

ZERO

Short the input of the multiplexer and adjust the ZERO potentiometer for a zero reading on the ADC readout (within the accuracy of the system).

GAIN

Regardless of the Gain of the GMD Amplifier, the output is usually 10 volts in order to be compatible to the ADC full scale. Each individual system will have its own gain requirement per customer specification (see Section 5 for System Specifications).

(a) Determine the input required to obtain a Full Scale reading on the ADC readout.

(b) Introduce the input between the HI and LO input of the GMD Multiplexer.

(c) Adjust the gain potentiometer to obtain a full scale reading on the ADC output.

Check the ZERO and GAIN adjustments again and make the necessary adjustments.

AMPLIFIER MULTIPLEXER

MODEL GMD-10/1000

HIGH GAIN

FUNCTIONAL DESCRIPTION MODEL GMD-10/1000 (Figure 90080)

The Model GMD Amplifier Multiplexer is a Differential Input Amplifier followed by a single-ended input, single-ended output semiconductor switch.

Figure 90080 is an over-all Block Diagram of the Model GMD Multiplexer in a system application. Analog signals are connected to the multiplexer channels by shielded cabling from the rear connector. Each multiplexer board contains, one amplifier, one multiplexer switch, associated drive control logic and analog overload clamps.

Control of the multiplexer channels may be directed from the front panel (optional GMC Logic Control Package, see Section 3 and Figure 90080) or by the customer interface at the rear panel connector (refer to Section 11).

SPECIFICATIONS MODEL GMD-10/1000

The specifications set forth in the following sections should be combined with the A/D Converter specification (refer to Page 8 of the GM Series A/D Conversion System brochure) in arriving at a total system performance specification.

GAIN: One fixed gain within the range of 10 to 1000, customer specified.

GAIN ACCURACY: +/-0.01%.

GAIN STABILITY (at constant temperature): +/-0.01%.

GAIN TEMPERATURE COEFFICIENT: 20 ppm/C.

LINEARITY: +/-0.01%.

ZERO STABILITY: 10 microvolts RTI and 1 millivolt RTO for 48 hours

ZERO TEMPERATURE COEFFICIENT: 1 microvolt/C RTI and 0.05 millivolt/C RTO.

INPUT IMPEDANCE: 10 megohms.

SHUNTING CAPACITANCE: Selected for system requirements.*(Normally 1 nanofarad)

*Depends on source impedance and data bandwidth requirements.

COMMON MODE REJECTION: 60 dB + gain or 108 dB DC to 60 Hz (whichever is smaller).

COMMON MODE VOLTAGE: 10 volts peak AC or DC for balanced inputs, 5 volts peak for single-ended inputs.

PUMPOUT CURRENT : 10 nanoamperes.

INPUT CONNECTION: Three wires --- Input high, input low and input guard.

NOTE: The signal source must not be floating. It may have no more than 10 megohms impedance to ground.

NORMAL MODE VOLTAGE: 20 volts maximum.

INPUT OVERLOAD RECOVERY: From input transition of +/-5 volts to 0 volts in less than 1 millisecond to 0.01% FS +/-10 microvolts RTI at full bandwidth

CROSSTALK: Less than 0.01% +/-3 microvolts RTI for 100 channels.

BANDWIDTH: -3dB at 20 kHz

SETTLING TIME: From +/-FS to 0 volts in less than 250 microseconds to

1 mV RTO +/-10 microvolts RTI.

NOTE: Settling time increases as input bandwidth decreases.

NOISE: Less than 20 microvolts peak RTI plus 1 millivolt peak RTO.

BANDWIDTH	RTI	RTO
20 - 60 kHz	30 uV	1 mV
1 kHz	6 uV	1 mV
100 Hz	2 uV	1 mV
10 Hz	1 uV	1 mV
1 Hz	1 uV	1 mV

OUTPUT (to ADC System): Commutated +/-10 volts full scale.

OUTPUT IMPEDANCE - ON: 500 ohms maximum.

OUTPUT LEAKAGE CURRENT - OFF: 15 nanoamps maximum.

SWITCHING TIME : 1 microsecond to 0.01% of full scale into a load of 10 megohms shunted by 50 pf. (Analog bus should be guarded and driven externally if load capacity exceeds 50 pf or if insulation exhibits dielectric absorption.

FAULT CONDITION: The multiplexer switch is protected against fault conditions of the amplifier.

TEMPERATURE: The amplifiers will meet the stated specifications over a temperature range of 0 C to +50 C.

OPERATING INSTRUCTIONS MODEL GMD-10/1000

The Multiplexer may be totally controlled by the customer or may be controlled by the optional GMC Logic Control Package described in Section 3. A description of these control methods appear in Sections 1 and 3 of this manual.

THEORY (Figure 90083) MODEL GMD-10/1000

The multiplexer switch is a FET (Field Effect Transistor). Figure 90083 shows a schematic of the GMD Amplifier Multiplexer displaying the channel address circuit, amplifier, and the FET switch circuit. Because the FET has no inherent offset voltage, whatever signal appears on the input will also appear on the output (when the switch is ON). One characteristic of the FET used in the Model GMD is that the switch is normallly ON with a ZERO gate voltage and is turned OFF by the application of a negative voltage of significant value applied to the gate.

Also shown in Figure 90083, the output of the GMD Amplifier output is connected to the DRAIN (D) and the multiplexer output is connected to the SOURCE (S) of the FET. When the gate is released from its negative potential and assumes the potential of the DRAIN, the FET will turn ON and the SOURCE will be brought to the potential of the DRAIN.

The multiplexer switch and its input amplifier appear in Block Diagram form in Figure 90082.

CALIBRATION MODEL GMD-10/1000

ZERO ADJUSTMENT

(a) Short the input HI and LO of the amplifier multiplexer to ground.

(b) Adjust the ZERO potentiometer for a zero reading at Pin 15.

(c) Measure the output of Pin 17. This value should be within a millivolt of the reading at Pin 15. If the difference exceeds 1 millivolt, perform the resistor selection as per Note 5 of the drawing.

PUMPOUT CURRENT ADJUST

(a) With the HI and LO input of the Amp/MUX shorted to ground insert a 10K ohm resistor in the LO input.

(b) Adjust the IBL potentiometer to return the post filter ouptut (pin 17) to zero.

(c) Move the 10K ohm resistor to the HI input and adjust the IBH potentiometer to return the post filter output to zero.

COMMON MODE ADJUST

(a) Tie the input HI and LO together.

SECTION 3

GMC LOGIC CONTROL SYSTEM

INTRODUCTION

When the optional GMC Logic Control is included in the MUX/ADC combination, the system may be operated in many different modes. A basic introduction to the modes of operation appears in Section 1 of this manual. The following series of paragraphs gives a functional description for the switches and controls located on the front panel.

FIRST ADDRESS

Selection of single channel address when MODE Switch is in RANDOM TEST, MAN or CONT; Selection of the first channel in a series when the MODE Switch is in NORMAL, SEQUENTIAL TEST, MAN or CONT.

LAST ADDRESS

Selection of the last channel when the MODE Switch is in NORMAL, SEQUENTIAL TEST, MAN or CONT.

MODE SWITCH

(a) NORM (Normal) --- In this position, the primary control of the multiplexer is at the customer's command via the rear connectors.

(b) RANDOM TEST --- Relates to the FIRST MUX ADDRESS only. When the MODE Switch is on the RANDOM TEST-MAN position, depressing the MANUAL button will select the channel indicated by the FIRST MUX ADDRESS. When the MODE Switch is in the RANDOM TEST CONT position, the control will automatically and continuously select the channel indicated by the FIRST MUX ADDRESS.

(c) SEQUENTIAL TEST --- This position incorporates both FIRST MUX ADDRESS and LAST MUX ADDRESS switches. When the MODE Switch is in the SEQUENTIAL TEST-MAN position, depressing the manual button will select, in order, the channels between and including FIRST and LAST MUX ADDRESS. Turning the MODE Switch to the SEQUENTIAL TEST-CONT position will allow an internal clock to sequence through the channels between and including the channels indicated by the FIRST and LAST MUX ADDRESS switches.

TEST POINTS --- Monitoring points only for specified signals of interest. In the standard configuration, the following signals may be monitored from the front panel test points: EXAD, COIN, CLOCK, BUSY, GND, and TADC.

INPUT CONTROL LINES (REAR PANEL CONNECTOR)

The following is a list of input control lines associated with the GMC Control System.

ADDRESS --- This is a multiplexer channel binary address externally furnished to randomly select a particular multiplexer channel. A TTL compatible binary word of four or more bits in length is required. This address is only effective when the front panel GMC Control Package MODE Switch is in the NORMAL position.

CLOCK (CLK) --- The CLOCK function is an externally furnished TTL pulse, 100 nanoseconds minimum width, which is used in conjunction with the (ADD-X, EXAD) function to (1) gate in the random binary address or (2) advance the multiplexer to the next channel. The CLOCK function also sets the proper delays to initiate the A/D Conversion process.

EXTERNAL ADDRESS (EXT ADD)---The EXT ADD function is a TTL level which establishes the mode of operation for the external CLOCK function. When the EXT ADD level is true the CLOCK function will be used to gate in the random channel address from an external i.e.,---and when the lever is false, the CLOCK function will be used to sequentially advance the multiplexer channels within the limits established by the front panel MUX address switches. The EXT ADD function is effective when the front panel CMC Logic Control System MODE switch is in the NORMAL position.

When sequentially advancing to the channel selected by the LAST MUX ADDRESS switches, the next CLOCK pulse will cause the channel indicated by the FIRST MUX ADDRESS switches to be selected.

RESET---The RESET function is an externally furnished TTL level, used to reset the internal register to the channel selected by the front panel FIRST MUX ADDRESS switches. Application of the RESET and CLOCK function will initiate a return to the channel selected by the FIRST MUX ADDRESS switches. Reset does initiate a conversion of the first channel. When the RESET function is not being used, it should be tied to the digital ground.

OUTPUT CONTROL LINES

NORMAL MODE---The NORMAL MODE function relates to the position of the front panel MODE switches for either or both the ADC and the multiplexer. When both of these front panel switches are placed in the NORM position, the signal on the designated pin of the rear connector (see customer connection drawing in Section 11) will appear as a TTL level HI with reference to ground. If either switch is changed to another position, the signal at the rear connector will appear as a TTL level LO.

END of SCAN (COIN)---The COIN function is a TTL level which becomes "true" upon selecting the "last channel" for digitizing as established by the front panel address.

BUSY---Indicates that the system is BUSY. Refer to the Test Report for the specific timing.

EOC---The A/D Converter will also provide a separate EOC function as indicated that the conversion is complete and the data lines have settled. This appears as a TTL pulse 100 nanoseconds minimum width. The EOC function may be used as an output data strobe.

SECTION 4

ANALOG-TO-DIGITAL CONVERTER

MODEL GMAD

FUNCTION DESCRIPTION

The Model GM Series Analog-to-Digital Converter is a solid state device that will upon command produce a binary digital representation of an analog input signal.

The digital output of the ADC is presented in a parallel binary word. The output code is customer specified. For full scale, conversion speed, accuracy, and timing, refer to the Test Report in Section 10.

The speed of the conversion or throughput rate varies with the model and resolution of the converter. The inclusion of a Sample-and-Hold Amplifier and/or multiplexer channels also effects the total conversion time of the system. Specifications located in this section are for the ADC only and do not represent the system operation. Refer to Section 5 of this manual for unique specifications concerning the entire system.

SPECIFICATIONS GMAD 1

CONVERSION RATES :

14 binary bits and sign	750 kHz
13 binary bits and sign	760 kHz
12 binary bits and sign	800 kHz
11 binary bits and sign	1 MHz

CONVERSION TIMES :

14 binary bits and sign	1.5 microseconds
13 binary bits and sign	1.4 microseconds
12 binary bits and sign	1.2 microseconds
11 binary bits and sign	1 microseconds

INPUT IMPEDANCE : 100 megohms or greater

SOURCE IMPEDANCE : 100 ohms maximum

DATA OUTPUTS : TTL

OUTPUT CODE :

(a) BINARY

True bipolar

One's Complement

Two's Complement

(b) BCD

True bipolar

Nine's Complement

Ten's Complement

ACCURACY :

14 binary bits and sign	+/-0.01%	+/-1/2 LSB
13 binary bits and sign	+/-0.015%	+/-1/2 LSB
12 binary bits and sign	+/-0.025%	+/-1/2 LSB
11 binary bits and sign	+/-0.05%	+/-1/2 LSB
10 binary bits and sign	+/-0.1%	+/-1/2 LSB
9 binary bits and sign	+/-0.2%	+/-1/2 LSB
8 binary bits and sign	+/-0.4%	+/-1/2 LSB
7 binary bits and sign	+/-0.8%	+/-1/2 LSB

INPUT VOLTAGE RANGE : Standard ranges are from +/-10 volts. Other ranges are available upon special request.

DIGITIZE COMMAND : Positive or negative slope and pulse width greater than 10 nanoseconds.

END-OF-CONVERSION : Parallel data ready indication, nominal pulse duration is 100 nanoseconds.

POWER : The ADC systems are equipped with their own integral DC power supply and require only standard line voltage (115v AC +/-10% 60 Hz).

SAMPLE-AND-HOLD GMSH-10 AND GMSH-100

GAIN : 1.000 +/-0.01%

GAIN STABILITY and LINEARITY : +/-0.01% of full scale

INPUT IMPEDANCE : Greater than 100 megohms.

SOURCE IMPEDANCE : 0 to 1000 ohms.

OUTPUT IMPEDANCE : Less than 1 ohm.

OUTPUT LOAD : 200 ohms minimum, 500 pf maximum.

SETTLING TIME (acquisition time to 0.01%) SAMPLE MODES :

(a) GMSH-10 :

0.5 microseconds from one full scale polarity to the opposite polarity (10 volts full scale)

(b) GMSH-100 :

2 microseconds from one full scale polarity to the opposite polarity (10 volts full scale).

HOLD DELAY

(a) GMSH-10 : 0.25 microseconds after HOLD pulse leading edge.

(b) GMSH-100 : 1 microsecond after HOLD pulse leading edge.

HOLD APERTURE

(a) GMSH-10 : 10 nanoseconds

(b) GMSH-100 : 50 nanoseconds

NOISE : 0.5 millivolts peak

DROOP IN HOLD MODE : +1 millivolt after 1 millisecond.

OPERATING TEMPERATURE : The converter will perform to the specifications stated, within a temperature range of 0C to +50C.

COOLING : For proper operation, the air surrounding the converter should be maintained between 0C and +50C, with a relative humidity note to exceed 70%. The converter utilizes its own fan for internal cooling.

STORAGE CONDITIONS : The converter will show no deterioration when subjected to storage temperatures of -55C to +85C and to relative humidities of up to 100% without condensation.

SIZE : The dimensions of the converter are 20 or 26-1/2 inches in length (total), 19 inches in width and 5-1/4 inches in height.

WEIGHT : The converter weighs 45 - 55 pounds (shipping weight is 60-75 pounds).

MOUNTING : The converter will mount into a standard 19-inch RETMA Rack.

OPERATING INSTRUCTIONS

The system operation of the GM Series ADC is covered in Section 1 and Section 3. Special system sequencing or operations may be found in Section 5 System Description.

ADC Front Panel Controls

Three controls related to the ADC in the system are located on the front panel. These are ADC TRIGGER FUNCTION SWITCH, ADC TRIGGER PUSHBUTTON SWITCH, and ADC ZERO. The ADC TRIGGER FUNCTION SWITCH has three positions :

NORM (Normal) position : This position is used when the ADC is being triggered by the systems GMC Logic Control Package (See Sections 1 and 3).

INT (Internal) : This position provides constant asynchronous conversion of the analog input at a rate determined by an internal clock located on the ADC timing circuit board (Clock frequency is typically 10 Hz).

MAN (Manual) : Placing the function switch in this position will allow a new conversion to be initiated each time that the ADC PUSHBUTTON SWITCH is depressed.

The ADC ZERO is a recessed screwdriver adjustable potentiometer to

allow for the correction of zero offsets that may be caused by peripheral equipment.

THEORY

The GM Series Analog-to-Digital Converter consists of a series of similar bit boards. Each bit board consists of two basic elements. These elements are : (1) an analog circuit for each individual bit and (2) a logic storage and decoding section for each individual bit (refer to Figure 90012).

In the GM Analog-to-Digital Converter, several of the above described bit boards are connected in series as indicated in Figure 90012, and each circuit receives, as its input, the output of the preceding circuit.

Each individual analog circuit is identical in operation. Schematically, the bit board (printed circuit) part values will change from the MSB to the LSB due to the decreased resolution of each successive bit board.

Using the block diagram in Figure 90012, note that each bit board, including the sign, has its own analog circuit and logic storage. The buffer is used to provide a high impedance to the source.

Each converter has the same transfer function as indicated in Figure 90013. If the "X" axis is the input signal of each of the analog circuits, then the "Y" axis in the resultant analog output of the circuit, e.g., as the input varies from minus 10 volts to plus 10 volts, the resultant output of the analog circuit will vary from plus 10 volts to minus 10 volts and back to plus 10 volts.

The logic storage stage is designed to give a logic output as follows: For all positive inputs to the analog circuit, the logic output will be a "0" and for all negative inputs, the logic output will be "1".

Figure 90014 shows the operation of a minus 10 volt to plus 10 volt signal and the subsequent outputs of each amplifier, along with the logic ("1" or "0"). For positive inputs, a logic "0" is realized and for negative inputs, a logic "1" is realized. In this manner, a Gray code logic may be obtained as a representative digital value of the input to the ADC.

The ADC operates in the Gray code rather than normal binary because this allows the progression of the code to advance only one bit at a time. To convert the Gray code into normal binary, the storage and decoding sections (see Figure 90014) use the following process:

> Starting with the MSB, which is connected to give a binary output that is the complement of the Gray code, each time a bit board is preceded by data output that is a "1" logical, that bit is reversed ("0" to a "1" and vice-versa). See the binary and Gray

codes in Figure 90014 for an example.

The GM Analog-to-Digital Converter follows the input signal at all times. To receive a digital representation of the input at any time, all that is necessary is to gate the storage sections simultaneously. The logic is then converted from a Gray code to binary and released to the output.

BIT BOARD DESCRIPTION

Figure 90015 is a block diagram of a bit board, the fundamental building block of the converter. The diagram includes the input amplifier (A1), the output amplifier (A2), the zero crossing detectors, the logic storage and decode logic.

Amplifier A1 output is connected to the zero crossing detectors and, depending upon whether the input to the amplifier is negative or positive, sets the logic of IC A3. The logic of IC A3 is stored at IC A3 when the GATE pulse is received. When the GATE pulse is received (the GATE pulses are also named UPDATE ADC and may be observed at the control board on test points marked DELAY 1 and DELAY 2), the logic is transferred to the IC's A1 and A2. Through interconnection with the subsequent and preceding bit boards, the Gray code is converted into the correct binary output. The output of Amplifier A2 is fed to the input of the next bit board and the above process is repeated. In operation, when all of the bit board's logic is settled the GATE pulse is applied and the binary digital representation of the analog input

appears at the output and is displayed on the front panel.

BUFFER OR SAMPLE-AND-HOLD

When the bandwidth of the analog input signal is below approximately 100 Hz a Buffer Amplifier is normally incorporated between the multiplexer output bus and the ADC. The buffer provides a high impedance load to the output of the multiplexer. The Buffer Amplifier is available in both differential and single-ended configurations. The gain of the buffer is dependent upon the full scale of the ADC.

When wide bandwidth data is encountered, a Model GMSH Sample-and-Hold Amplifier is employed.

Figure 90016 is a block diagram of the GM Series Sample-and-Hold Amplifier. The basic design is two amplifiers in series. The first amplifier may be either differential or single-ended and provides a high input impedance with low output impedance for the Sample-and-Hold Amplifier.

The second amplifier is connected as an integrating amplifier. This amplifier follows the output of the first amplifier until the sample-and-hold command switches from the sample mode to the hold mode. When the command goes to "hold", the second amplifier is disconnected from the first amplifier and its own DC feedback and the signal that was last on the input of the integrating amplifier is held by the feedback capacitor. The DC signal can be held for as long as a

millisecond before deterioration begins (see specifications Section 4).

SECTION 5

SYSTEM DESCRIPTION

INTRODUCTION

This section contains a brief general outline of your particular system. It also contains information concerning special specifications or configurations of the system.

Your GM Series Analog-to-Digital Conversion System is identified by the part number 58855-00, 58700-03, and 58845-00. This part number describes a system consisting of:

[1] One channel of Model GMD-100 AMP/MUX (channel identification No. 1).

[2] Two channels of Model GMD-1 Amplifier/Multiplexer (channel identification No's 2 and 3).

[3] Wiring for a fourth AMP/MUX identifcation No. 0.

[4] Eight (8) channels of Model GMM Multiplexer (channel identification No's 4 thru 11).

[5] Wiring for an additional eight (8) channels of GMM MUX (channel identification No's 12 thru 19).

[6] A Model GMSH-100 Sample-and-Hold Amplifier incorporated between the

multiplexer bus and the input to the ADC.

[7] A Model GMAD1-15B Analog-to-Digital Converter.

[8] A Multiplexer channel expander module to increase the total channel capacity to 96 channels.

Multiplexer channel selection may be random access binary address or sequential scan via the Model GMC Logic Control System. A block diagram appears in Figure 90102.

SPECIFICATIONS

FULL SCALE: Model GMD-1 Multiplexer: +/- 10.24 volts
Model GMD-100 Multiplexer: +/- 0.1024 volts
Model GMM Multiplexer: +/- 10.24 volts

RESOLUTION: 14 binary bits and sign

OUTPUT CODE: Two's Complement

LOGIC LEVELS: Positive True TTL

OUTPUT DATA: Both the true and false sides of the data will be available at the output connector.

CONVERSION TIME: 3.5 microseconds per channel

SPECIAL FEATURE

Both the true and false sides of the sign line are made available at the rear connector. This function will allow the converter to be used as a "Zero crossing detector" in that the sign line will change as the input signal changes polarity. A control line will be pro vided to

enable function.

When the above mode is used, the Sample-and-Hold Amplifier at the A/D input should remain in the "Sample" mode. (The multiplexer cannot be dynamically operated nor the SH/AD Combination be commanded to convert when the "Zero crossing" mode is employed).

The System conforms to a Hughes Specification Number 258392 Rev. A. The first and last channel of the multiplexer may be remotely addressed.

Also this system contains both low gain and high gain Model GMD Amplifier Multiplexers.

INTERFACE CONTROL

REAR PANEL CONTROLS

MODE	F/L REG	EXT ADD	RESET	DTADC	F/L CLK	INTADC/ INTMUX CLK	MUX CLK
(1)	HI	LO	LO	GND	*	**	PULSE
(2)	X	HI	LO	GND	X	**	PULSE
(3)	LO	LO	LO	GND	X	**	PULSE
(4)	LO	LO	HI	GND	X	**	PULSE
(5)	X	X	X	PULSE	X	**	GND

(1) SEQUENTIAL EXTERNAL CONTROL
(2) RANDOM ADDRESS EXTERNAL CONTROL
(3) NORMAL MODE SEQUENTIAL FRONT PANEL CHANNEL SELECT
(4) NORMAL MODE RANDOM FRONT PANEL CHANNEL SELECT
(5) MULTIPLEXER BYPASS DIRECT TADC

X = DON'T CARE

* When operation in Mode 1 a Pulse on F/L CLK will change the First and Last channel registers, but no sequencing will occur until the MUX CLK is applied. Therefore the first and last channels may be addressed, entered and stored and then the MUX CLK may be applied when sequencing is desired.

Also if desired the F/L CLK and MUX CLK may be the same pulse or simultaneous.

** In all Modes the INT ADC and the INT MUX CLK are tied together at the rear connectors.

MODE DEFINITIONS

(1) SEQUENTIAL, EXTERNAL CONTROL

Permits sequential scan and conversion of multiplexer channels whose scan limits are set by remote first and last multiplexer address.

A channel step will be provided each time an external clock is received.

(2) RANDOM ADDRESS, EXTERNAL CONTROL

Permits signal channel selection and conversion of a multiplexer channel from a remote multiplexer address. This process is initiated by an application of an external clock.

(3) NORMAL MODE SEQUENTIAL FRONT PANEL SELECT

Permits sequential scan and conversion of multiplexer channels whose scan limits are set by the front panel first and last multiplexer address switches.

(4) NORMAL MODE RANDOM, FRONT PANEL SELECT

Permits selection and conversion of a single channel whose selection is determined by the front multiplexer address. Initiation of process requires an external clock pulse.

(5) MULTIPLEXER BYPASS, DIRECT TADC

Permits control of conversion initiation without the multiplexer delay involved. Operation requires prior selection of desired channel via the Random Modes. Upon receipt of a DTADC pulse the sample and hold amplifiers will go to the Hold MODE and a conversion will be initiated.

MULTIPLEXER EXPANDER MODULE

An Expander module P/N 58845 that will increase the total channel capacity to 96 has been designed for use with the P/N 58700 ADC System. This expander module consists of the following multiplexer models.

MODEL	DESCRIPTION	CHANNEL NUMBER
GMD-10	FS=+/-1.024 volts	20-29
GMD-0.75	FS=+/13.6533 volts	30-31
GMD-0.5	FS=+/-20.48 volts	32-39
GMD-0.25	FS=+/-40.96 volts	40-51
GMD-0.125	FS=+/-81.92 volts	52-55
GMMD	FS=+/-10.24 volts	64-103

Multiplexer channel control is via the Model GMC Logic Control System mounted in the P/N 58700 Card Module.

ANALOG OUTPUTS

The continuous analog output from the Model Gmd Channels 20, 21, 32, 33, 40, 41, 52, and 53 is available on one multipin Wichester connector.

SECTION 6

CALIBRATION

INTRODUCTION

This calibration procedure describes the step-by-step method for calibrating the GM Series Multiplexing Analog-to-Digital Conversion System. Hardware and placement of certain boards may be different depending upon each customer's requirement, but basic calibration is the same for each individual instrument.

Please refer to the top assembly drawing for the individual plug-in-board placement. Refer to the assembly drawings of each individual plug-in board for variable resistor and capacitor placement, pin numbers, and test points. All of the above are located in Section 11.

When making adjustments in the preliminary and final calibration, it will be necessary to maintain a proper air flow within the chassis. For the preliminary calibration, remove the top cover, turn it over and place it on top of the unit so that only the first row of boards will be visible. This will maintain near proper air flow and still allow

access to the ADC calibration and timing adjustmments that will be made during the preliminary calibration.

During the final calibration, the unit will most likely be in an environmental chamber. The top and bottom covers should be in place during the measurements. If an adjustment is necessary, the cover can be removed for these adjustments. However it is recomended that the adjustment be made in the shortest time possible and the cover be replaced after the adjustment is made. After the cover has been replaced, time should be allowed for the air flow to return to normal before recording any further measurements.

Your A/D Converter System has undergone complete calibration in our factory test department (a copy of the original test report is provided in Section 12 of this document). Assuming there are no catastrophic failures, it should not be necessary to perform a detailed calibration on this equipment for several years. It will be necessary to periodically verify the calibration (using the following procedure). The recommended time between calibration verification is six months. Before any attempt to calibrate the instrument is made, a check should be performed to verify that the unit is either in or out of specification and does indeed need calibration.

(a) Refer to the factory test report for a review of the full scale, output, binary code, resolution, etc.

(b) Select the digital output binary values that are of or near 1/2,

1/4, 1/8 or 1/16 full scale in both polarities (refer to the test report for examples of these numbers).

(c) Introduce the analog value into the ADC to produce one of the binary numbers mentioned in Step (b).

(d) By comparing the readings derived in Step (c) with known correct numbers, it can be determined if the unit is in or out of specification and whether calibration of the unit is necessary.

The results can also be compared to the factory test report results if the binary values listed on the report were used in Step (b). If the factory test results are used as a guide in determining the binary values to be checked, there may be a difference between the value shown on the test report and your results. Although this difference may occur, the value to rely on for determining the validity of the calibration will be the difference between your results and the theoretical input value. The error margin is noted at the top of the test report and is nomenclatured as "THEORETICAL ANALOG INPUT +/-____millivolts".

TEST EQUIPMENT

Equipment recommended for calibration consists of the following:

(a) A stable DC analog voltage source, variable over the range of +/- full scale input voltage or +/-10 volts whichever is greater. The voltage resolution should be at least 25% of the least significant bit. The source impedance should be less than 1000 ohms.

(b) Oscilloscope, Tektronix 545A, with 1A5 and CA Preamplifiers, or equivalent.

(c) Five-digit digital voltmeter, differential voltmeter, or equivalent. The accuracy should be at least twice that of the system being tested.

(d) Triangle wave generator with a capability of 20 volts peak-to-peak into a 470 ohm load at 1 kHz.

(e) VOM such as Simpson 260.

(f) Pulse generator to provide clock pulses of an equivalent in amplitude width and frequency to the normal system operating pulses.

(g) Printed circuit card extender, bit board extender (Part No. 52315) and Sample-and-Hold Buffer extender (Part No. 52318). All three are supplied with the unit. (Part No. 52315 and 52318 may be

replaced by a single extender Part No. 52330.)

PRELIMINARY CALIBRATION (at room temperature 25 +/-3C)

In the GM Series ADC each binary bit is controlled by a single printed circuit board with the exception of the four least significant bits. During calibration, each board will be adjusted individually starting with the least significant bit (excluding 1, 2, 4 and 8). There are some adjustments that relate to the least four bits and the adjustments are discussed in this section.

(a) Check the plus and minus reference supplies and set them for 10.000 volts.

(b) Locate the least significant bit board (excluding the least four bits 1, 2, 4 and 8). This will be the AMP/Logic board nearest to 4 bit amplifier board. (Normally bits 1, 2, 4 and 8 are on two boards and are not adjusted per this procedure). If the ADC does not contain a four bit amplifier and a four bit logic board disregard the references to these boards and begin the procedure with the least significant bit board.

(c) Remove the next more significant AMP/Logic Board located just prior to the one mentioned in Step (b) and replace it with the Bit Board Extender.

(d) This board is designed to allow the operator to isolate a

particular board from the higher order bits and introduce an input directly into that bit board. The operator may use a standard extender board and use the following pin numbers for connecting the input signal.

BIT BOARD EXTENDER	LABEL
Pin #9	Input Hi
Pin #4 and #5	Ground (low)

NOTE: JUMPER PINS 38 TO 35 (logic).

For extender replacement of the Sample-and-Hold board, the pin numbers are as follows:

SAMPLE-AND-HOLD

EXTENDER	LABEL
Pin #22	Input Hi
Pin #16	Input Low (Gnd.)

NOTE: DO NOT JUMPER PIN 38 TO 35 AS ABOVE.

(e) Connect the DVM through a 470 ohm resistor to the test points marked A2 and ANA GRD (Figure 90017) located on the least significant

bit board, (excluding the 4 bit amp and logic boards). This is normally the last "C" board. Connect the variable DC source (with monitor) to the signal board extender (Pins 4 and 9). The input value must be measured directly at Pins 4 and 9 or remote sense lines must be used to compensate for the voltage drop in the input cable.

(f) Set the DC source for minus 10 millivolts and note the reading of the DVM.

(g) Set the variable DC source for plus 10 millivolts and adjust potentiometer label B0 so that a plus 10 millivolt input produces the same reading (at A2) as minus 10 millivolts did. Switch between plus 10 millivolts and minus 10 millivolts and adjust B0 with the plus 10 millivolts input until there is no change in the reading of the DVM.

(h) Set the variable DC source for 0 VDC and adjust the potentiometer labeled zero until the reading at A2 is as close as possible to minus 10 volts.

(i) Set the variable DC source for plus 10 volts and adjust the potentiometer S2 for a plus 10.000 volt reading at test point A2 (Figure 90017).

(j) Set the variable DC source for minus 10 volts and adjust potentiometer S1 for a plus 10.000 volt reading at test point A2 (Figure 90017).

(k) Repeat paragraph number two of step (f) and (g) to check the symmetry.

(l) Repeat step (h) to check the zero setting.

(m) Repeat step (i) and (j) to check the full scale of the bit board.

(n) Return voltage input to 0 volts.

SUBSEQUENT BIT BOARD ADJUSTMENT

(a) Remove the signal board extender.

(b) Replace the bit board that had been previously removed.

(c) Remove the next more significant bit board and insert the signal board extender.

(d) Set the DC source for minus 10 millivolts and note the reading of the DVM.

(e) Set the variable DC source for plus 10 millivolts and adjust potentiometer label B0 so that a plus 10 millivolt input produces the same reading (at A2) as minus 10 millivolts did. Switch between plus 10 millivolts and minus 10 millivolts and adjust B0 with the plus 10 millivolts input until there is no change in the reading of the DVM.

(f) Set the variable DC source for 0 VDC and adjust the potentiometer labeled zero until the reading at A2 is as close as possible to minus 10 volts.

(g) Set the variable DC source for plus 10 volts and adjust the potentiometer S2 for a plus 10.000 volt reading at test point A2 (Figure 90017).

(h) Set the variable DC source for minus 10 volts and adjust potentiometer S1 for a plus 10.000 volt reading at test point A2 (Figure 90017).

(i) Repeat paragraph number two of step (f) and (g) to check the symmetry.

(j) Repeat step (h) to check the zero setting.

(k) Repeat step (i) and (j) to check the full scale of the bit board.

(l) Return voltage input to 0 volts.

(m) Repeat steps (a) through (n) for all bit boards in sequence moving from the least significant "C" board through the most significant "B" board.

(n) Perform the calibration steps as outlined in "FOUR BIT CALIBRATION" for the 4 bit amplifier/logic boards.

(o) Repeat steps (a) through (c) for the "AB" amplogic board.

NOTE: From this point on in the calibration procedure, the front panel digital readout lamps will be used to monitor the results of the adjustments.

(p) Set the input to the AB board for minus 0.078 volts. Adjust the zero potentiometer on the "AB" board, refer to Figure 90017, for a digital readout of X X X X X 1 0 0 0 0 0 0 ____* (ignore the readouts represented by the X).

*The 3 least significant bits are used for the transition point recognition. The transition point is the point where the 3 to 4 binary change takes place. The lights will appear to be only partially ON and this should not be confused with the binary number 7 where all indicators are ON full.

(q) Set the input to the "AB" board for a plus 0.078 volts. Adjust the BO potentiometer on the "AB" board for a digital readout of:

X X X X X 0 1 1 1 1 1 1 ____*

(r) Set the input to the "AB" board for minus 9.922 volts and adjust the S1 potentiometer for a digital readout of:

X X X X X 1 1 1 1 1 1 1 ____*

(s) Set the input to the "AB" board for plus 9.922 volts and adjust the S2 potentiometer for a digital output of:

X X X X X 0 0 0 0 0 0 0 ____*

(t) Repeat steps (a) through (c).

(u) Set the input to the 'A' analogic board (Figure 90018) for plus 0.117 volts and adjust the Z1 potentiometer for a digital output of:

X X X X 0 1 1 1 1 1 1 0 ____*

(v) Set the input for minus 0.195 volts and adjust the Z2 potentiometer for a digital output of:

X X X X 1 0 0 0 0 0 1 0 ____*

(w) Set the input for plus 9.805 volts and adjust the K1 potentiometer for a digital output of:

X X X X 0 0 0 0 0 0 1 0 ____*

(x) Set the input for minus 9.883 volts and adjust the K2 potentiometer for a digital output of:

X X X X 1 1 1 1 1 1 1 0 ____*

(y) Repeat steps (a) through (c).

(z) Repeat the steps (u) through (x) using the following input voltages and adjusting the respective potentiometers for the indicated digital outputs.

INPUT	ADJUST	DIGITAL OUTPUT
+ 0.0586	Z1	X X X 0 1 1 1 1 1 1 1 0 ____*
- 0.0976	Z2	X X X 1 0 0 0 0 0 0 1 0 ____*
+ 9.9023	K1	X X X 0 0 0 0 0 0 0 1 0 ____*
- 9.9415	K2	X X X 1 1 1 1 1 1 1 1 0 ____*

(aa) Repeat steps (a) through (c).

(ab) Repeat steps (u) through (x) using the following input voltages and adjust the respective potentiometers for the indicated digital outputs.

INPUT	ADJUST	DIGITAL OUTPUT
+ 0.0293	Z1	X X 0 1 1 1 1 1 1 1 1 0 ____*
- 0.0488	Z2	X X 1 0 0 0 0 0 0 0 1 0 ____*
+ 9.9512	K1	X X 0 0 0 0 0 0 0 0 1 0 ____*
- 9.9707	K2	X X 1 1 1 1 1 1 1 1 1 0 ____*

(ac) Repeat steps (a) through (c).

(ad) Repeat steps (u) through (x) using the following input voltages and adjust the respective potentiometers for the indicated digital outputs.

INPUT	ADJUST	DIGITAL OUTPUT
+ 0.0147	Z1	X 0 1 1 1 1 1 1 1 1 1 0 ____*
- 0.0244	Z2	X 1 0 0 0 0 0 0 0 0 1 0 ____*
+ 9.9756	K1	X 0 0 0 0 0 0 0 0 0 1 0 ____*
- 9.9854	K2	X 1 1 1 1 1 1 1 1 1 1 0 ____*

(ae) Repeat steps (a) through (c)

(af) Repeat steps (u) through (x) using the following input voltages and adjust the repective potentiometers for the indicated digital outputs.

INPUT	ADJUST	DIGITAL OUTPUT
+ 0.0122	Z1	0 1 1 1 1 1 1 1 1 1 0 ____*
- 0.0078	Z2	1 0 0 0 0 0 0 0 0 1 0 ____*
+ 9.9924	K1	0 0 0 0 0 0 0 0 0 1 0 ____*
- 9.9881	K2	1 1 1 1 1 1 1 1 1 1 0 ____*

(ag) At this point the buffer on Sample-and-Hold Amplifier may be installed and the ADC checked for final calibration, continue with the Buffer Amplifier portion of this section.

FOUR BIT CALIBRATION (Figure 90020)

(a) Remove the bit board preceding the 4 bit amp.

(b) Place the board extender into the slot.

(c) Connect a triangular wave generator to the signal board extender inputs.

(d) Set the output of the generator for triangular wave of 20.0 volts peak-to-peak 1 kHz (symmetrical about zero + 10V.0V to - 10V.0V)

(e) View the output AMP 1 on an oscilloscope and set the symmetry BO 1 so that all waves on the scope are symmetrical about the triangle peaks.

(f) Set the potentiometer Z1 so that the output is symmetrical about zero.

(g) Repeat steps (e) and (f) for amplifier output AMP 2 using BO2 and Z2 potentiometers.

(h) View the test point for AMP 3 and adjust BO 3 and BO 4 so that there is less than 10% phase modulation of the displayed square wave over one cycle of sawtooth wave.

(i) Remove triangle waveform and replace it with a DC source variable -10V to +10V. Remote sense not required.

(j) Adjust voltage source as required to produce all digital counts on least significant bits per 4 bit amp linearity sheet (Figure 90019). Note voltages. Remove DC source.

(k) If the voltages are not within +/-0.2 volts of the listed values, reconnect the triangular waveform per (c) and repeat (d) through (i).

FOUR BIT CALIBRATION (alternate method)

(a) Do steps (a) and (b) of the previous Four Bit Calibration procedure and center all potentiometers.

(b) Connect a precision DC source to the signal board inputs.

(c) Set the input to 0 volts and adjust the B01 potentiometer so that the front panel least significant bits toggle between 0 1 1 1 and 1 0 0 0.

(d) Change the input to plus 2.5 volts and adjust B03 potentiometer so that the front panel display toggles between 0 1 0 1 and 0 1 1 0.

(e) Change the input to plus 1.25 volts and adjust B04 so that the front panel display toggles between 0 1 1 0 and 0 1 1 1.

(f) Change the input to plus 5 volts and adjust B02 potentiometer so that the front panel display toggles between 0 0 1 1 and 0 1 0 0.

(g) Check steps (c) and (f).

(h) Change the input to plus 8.75 volts and adjust Z1 potentiometer so that the front panel display toggles between 0 0 0 0 and 0 0 0 1.

(i) Run a linearity check per Figure 90019.

(j) The total error should not exceed +/-0.25 volts.

BUFFER AMPLIFIER

PRELIMINARY

All GM Analog-to-Digital Converters will have either a Sample-and-Hold or a Buffer Amplifier at the input to the ADC.

The calibration of the Buffer Amplifier should be done after the calibration of the ADC bit boards in order to allow the ADC to be used as a measuring instrument.

If there is not a multiplexer involved in the same chassis as the ADC, direct connection to the input of the buffer can be accomplished at the rear panel connector.

If a multiplexer is involved in the ADC chassis, connection to the input of the buffer may be accomplished by either of two methods:

(a) Selection and addressing of a particular multiplexer channel and removal of the board containing that channel to enable connection to the input of the buffer through the common bus line of the multiplexer using the extender board.

(b) Selection and addressing of a particular multiplexer channel and removal of the board containing that channel and then placing the Buffer Amplifier on an extender board and connecting to the input of the buffer directly through pins of the Buffer Amplifier itself.

COMMON MODE RTO (Refer to Figure 90021)

The common mode adjustment need only be made if the Buffer Amplifier is to be used as a differential input device.

(a) Tie the input HI and LO together.

(b) Apply a 5v, 60 Hz, ADC signal between the tied-together HI, LO and ground.

(c) Observe the output at the test point marked OUTPUT and adjust the RTOCM potentiometer for a minimum output.

(d) When a Common Mode RTO adjustment potentimeter appears on a Buffer Amplifier and the buffer is used as a single-ended input device, the CM RTO potentiometer is to be set to the center of its span.

ZERO (Refer to Figure 90021)

Short E1 (input HI) to ground. Monitor the output at the test point between the RTO CM and GAIN potentiometers with a DVM and adjust the ZERO potentiometer for a 0.000 output.

GAIN (Refer to Figure 90021)

The gain of the Buffer Amplifier in the GM ADC will depend upon the customer's input full scale and output code requirements.

Regardless of the buffer input characteristics, the GM ADC operates on a 20 volt signal swing (+10 to -10 volts). Therefore, the gain of the buffer is adjusted to compensate for the input full scale requirements.

Also due to special requirement of the customer or the A/D System, the buffer may be non-inverting or inverting. The methods for calibration of the gain will vary depending on these amplifying characteristics of the buffer.

(a) Non-Inverting: A gain of 1 buffer with a non-inverting output is calibrated by looking at the input and output differentially on an oscilloscope. Adjust the GAIN potentiometer until there is minimum difference between the input and output of the buffer.

NOTE 1. When the non-inverting buffer gain is other than a gain of 1, it will be necessary to use a divider on the input as in Figure 90022.

The input divider is selected to give an input to the buffer that will produce a full scale output. Measure the input against the output differentially on an oscilloscope and adjust the GAIN potentiometer for a null on the scope.

(b) Inverting: A gain of 1 buffer with an inverting output is calibrated by connecting the input and output per Figure 90023.

R1 and R2 are of equal value. Observe the output at test points P-P

and adjust the gain for a minimum difference as indicated by the oscilloscope.

NOTE 2. When the inverting buffer gain is other than 1, it will be necessary to raise or lower the values of either R1 or R2 to compensate for the gain.

(c) Inverting or Non-Inverting (Alternate Method): Introduce into the input of the buffer a value which will give a 10 volt output. This value is determined by the gain buffer which in turn is determined by the Full Scale of the ADC.

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EXAMPLE: If the full scale of the ADC is 5 volts, the gain of the buffer will be two (2) to allow the ADC to operate at a 10 volt level. Adjust the GAIN potentiometer to bring the output of the buffer +/-10 volts.

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TOTAL SYSTEMS ADJUSTMENTS

With the assumption that the ADC has been calibrated separately per the procedure in Section 6, it will still be necessary to check calibratiom of the combination ADC-Buffer, ADC-Buffer-Mux, or ADC-S&H-MUX Assembly.

(a) Set or verify that the front panel zero potentiometer is in approximately the center of its mechanical span.

(b) Apply a zero input to the buffer through the rear connector. If a mutliplexer is included, select a single channel. If the multiplexer has an amplifier (Model GMD) in its circuitry, it will have to be calibrated separately before marking these system adjustments. Adjust the buffer zero potentiometer to produce a zero output in the digital output of the ADC System.

(c) Using a near full scale input, adjust the GAIN potentiometer of the buffer to produce an equivalent digital output.

NOTE: The above statements are intended to be touch-up adjustments for the system and are only valid if the ADC has been previously calibrated as an individual part.

GMSH SAMPLE-AND-HOLD AMPLIFIER (Optional) (Figure 90024)

PRELIMINARY

The calibration of the Sample-and-Hold Amplifier should be done after calibration of the Analog-to-Digital Converter. This allows the ADC in the system to be used as a measuring instrument. With reference to the inputs to the Sample-and-Hold, these inputs may be at the rear connector of the unit. However, if the Sample-and-Hold is between the multiplexer and the ADC, it will be necessary to select a multiplexer channel and use that channel for the input. Connect to the multiplexer channel either at the rear connector or remove the channel circuit board and introduce the signal at the common multiplexer output buss.

COMMON MODE

The Common Mode adjustment is necessary for all differential input Sample-and-Hold Amplifiers. Sample-and-Hold Amplifiers with single-ended inputs do not require a Common Mode adjustment. All that is necessary is that the Common Mode Potentiometer (RTCOM) be placed in the center of its span.

(a) Tie the input HI and LO together.

(b) Apply a 5 vac 60 Hz sine wave between the combined HI-LO and ground.

(c) Operate the system so that the unit is in sample or cycling between Sample-and-Hold.

(d) Observe the output at the test point labeled "SH".

(e) Adjust the RTCOM potentiometer for a minimum output.

JUMP ADJUSTMENT (Figures 90025, 90026)

(a) Verify that the ADC timing is correct and the ADC is running at or near the maximum rate.

(b) Adjust the input to 0 volts.

(c) View the output on the test point "SH" with an oscilloscope, and adjust the JUMP potentiometer until both the Sample-and-Hold levels are settled to the same value as pictured in Figure 90026.

NOTE: The above is done best with a sensitive oscilloscope preamp like the 1A5 or the scope input may be placed with the first A Board at the test point marked A2.

PRELIMINARY ZERO AND GAIN SETTINGS

(a) Zero: Set the front panel zero potentiometer to the center of its span. Short the HI and LO together. Using an oscilloscope adjust the zero potentiometer for a zero output at the "SH" test point on the

circuit card. This measurement should be made during the Hold period.

(b) Gain: Introduce a plus full scale signal (the amplifier may have gain) into the amplifier. Observe the test point "SH" with a DVM and adjust for a 10 volt output.

FINAL JUMP SETTINGS

Repeat JUMP ADJUSTMENT (a), (b) and (c).

FINAL ZERO AND GAIN SETTINGS

Repeat PRELIMINARY ZERO AND GAIN SETTINGS (a) and (b).

FINAL CALIBRATION

After the preliminary calibration has been completed, the major transition bit widths, linearity and overall accuracy still must be verified.

DIGITAL OUTPUT CODE OF ADC

The output codes in this final check assume a Two's Complement output code. If the ADC is true bi-polar, it can easily and temporarily be converted to Two's Complement by removing the bottom cover and making the following changes:

(a) Locate the wire that runs from the second "A" board MSB pin 33 to ground. Remove the end of the wire in pin 33 and connect it to the first "A" board (pin 32).

(b) Connect a jumper from the first "A" board pin 35 to the second "A" board pin 36.

After completion of these final calibrations, the wires may be returned to their correct locations.

A One's Complement output code may be checked with this same procedure as if it were a Two's Complement. After making the required adjustments, the width of the combined + and - zero's are adjusted to be two bits wide. No actual internal logic exists to remove the extra

zero code (- 11 111 111 111 111) for non-existent "minus zero" characteristic of the Two's Complement code. All examples shown are for a 4 bit and sign resolution. The same adjustments apply to lesser resolutions (down to 10 bits).

INITIAL SET-UP (Figures 90027, 90028)

(a) With the rear panel power switch in the OFF postion, make all the necessary input and output connections. This includes control lines for the multiplexer (if present), AC power, analog inputs and external clock signal. If the multiplexer inputs are present, connect them in groups per Figure 90027 or 90028.

NOTE: The analog inputs must never be left open.

External control lines unless otherwise specified are standard TTL levels. Pulse widths are 100 nanoseconds minimum. Unused digital input control lines (reset, etc.) must be tied to digital ground.

(b) Connect a voltage calibrator or a variable DC source with DVM to the analog input(s) and adjust the output of the calibrator for zero volts.

(c) Place the power switch (rear panel) to the ON position and allow an one-half hour warm-up.

(d) Adjust an external clock pulse generator to the maximum conversion rate of the ADC or system.

(e) Using an oscilloscope, recheck the timing pulses for the correct settings (see Section 12 for the Test Report).

(f) Check the plus and minus 10 volt reference supply.

(g) Set the multiplexer channel to "0" if applicable.

(h) Verify that the front-panel indicators are operating by varying the analog input.

(i) Place the calibration covers (see the note on covers in the Introduction of Section 6) on the ADC and allow the airflow to stabilize for 5 minutes minimum.

These covers are especially made at our plant and have slots machined in them to permit access to the adjustment potentiometers. If one of these covers is used, one must still cover all of the remaining slots that are not being utilized for adjustments. If no special cover is available, adjustment may be made by removing the cover only for the adjustment. When this method is used, time should be permitted for the airflow to normalize after the cover has been replaced.

SIXTEEN (16) POINT LINEARITY

The method used to determine corrections required is to plot a 16 point linearity curve and compare it with the theoretical curve. Points plotted are at 1/4 scale increments from minus full scale to plus full scale. Actual transitions are plotted on both sides of major bits and near full scale. These points provide a picture of which adjustments are required for final calibration. This proves to be especially true when the actual bit is missing due to misadjustment.

Known D.C. voltages are applied to produce codes listed in Table 90050. All codes that are 1/8 scale increments are not normally plotted unless a problem condition is present. Only the +/- 7/8 scale transition points are plotted to verify that transition width. This also allows a better drift setting of the 4th A board zero at temperature. The specific points on Table 90050 were selected to provide an easily recognized binary pattern.

Voltages required to produce these patterns are recorded and compared to the theoretical values. The algebraic differences, in millivolts, are plotted as errors on a vertical axis (See Figure 90029). The horizontal axis show analog inputs from minus to plus full scale.

Points are plotted from minus to plus full scale in sequence per Table 90051. Points on each side of a transition point are plotted as though they occured at the transition point. This means that transitions on both sides of a bit are plotted at the same horizontal coordinates.

Example: -2.5080 & -2.4877 (typical values) are plotted at -2.5V. The important part is to connect points in proper sequence. If the typical readings are the same as the theoretical values, a straight line with 0 errors like Figure 90029(B) would result. With the transitions at zero width, any change due to drift or component aging could result in a reversal or 'flipped' transition. This in turn could result in a missing bit. To avoid this, the transition width is purposely adjusted to a width of approximately .8mv. Figure 90029(A) shows all widths at .8mv.

The transition errors plotted on both sides of any bit must always be in a minus to plus direction. If not a correction must be made. When making corrections always make adjustments to least significant bits first since they affect more significant ones. Example: If 1st, 2nd and 3rd 'A' board adjustments are required, the 3rd 'A' should be adjusted first, then the 2nd, then the 1st. It is normally a good practice to plot a curve after each adjustment to be sure only the intended changes were made and no others.

In Figure 90029(A) all errors are .4mv in the correct directions.

Slopes of the segments should all be similar. If the slopes are not similar, certain adjustments may be made to correct the slopes (see K2 and K1 adjustment curves).

Observe symmetry of adjustments in curves in Figures 90031 through 90042.

The four important items displayed on these curves are:

1. Transition widths = W
2. Slopes
3. Zero Offsets
4. Gain Errors (Slope of entire curve)

For this reason, no attempt is made to correct these curves to the ideal theoretical curve (Figure 90029(B). The curve instead, is corrected to one similar to Figure 90029(A), the Ideal Practical Curve. Real curves do not usually look as perfectly symmetrical as the Figure in Figure 90029(A), however, all points must be within the overall accuracy of the ADC under test.

Figures 90031 to 90043 B & C show the affect of adjustments on the first three most significant bit boards on the overall curve.

NOTE: The 4th 'A' board affects the 1/8 scale increments in a similar manner. The theoretical values are included in the computer printed work sheet (Figure 90030).

In Table 90050 the codes always display the same pattern for the last 5 bits.

BIT 16	ON
BIT 8	OFF
BIT 4	OFF/ON
BIT 2	ON/OFF
BIT 1	ON/OFF

The mark (____*) on the last 3 bits indicates a binary 3 4 change. At this point the code is alternating from 3 to 4 or 100 to 011.

Running at normal speed the change can be observed by an equal brilliance of the last 3 indicators. As the input is changed by a small amount the 3 or 4 code will come on. It must not be confused with the binary 7 where all three indicators are solid 'ON'. If the exact center is desired, a DC voltmeter may be connected across the '4 bit' to digital ground. Adjust input so that the 4 bit is on solid. Note voltage. When the meter indicates 1/2 the noted voltage, a 50% duty cycle will be present. This means the 4 is on 1/2 the time which in turn means the 2 & 1 are ON the other 1/2. This procedure is usually only required where noise makes it difficult to determine the transition point.

ADJUSTMENTS TO CURVES

Adjusting the Z1 and the Z2 potentiometers will remove any transition errors present (see Figure 90018). These corrections should be made to approach the Ideal Practical Curve in Figure 90029(A).

The actual curve, although not as perfectly shaped as the Ideal Curve, must be within the tolerance of the ADC. If the ADC is to be temperature cycled, retain this curve after it is corrected and mark it 25 C.

Errors at the transition points should always go from minus to positive

as input goes from negative to positive: Example points [2] & [3] (Figure 90029A). The error at point [3] must be more poitive than the error at point [2]. If not, corrections are made as required.

Transition width adjustments affect more significant bit transitions. Therefore an adjustment to the 3rd A Board zero will require readjustment of the 1st and 2nd A board zeroes. Z1 and Z2 adjustments do not affect the slope but slope adjustments do affect slope and zeroes of more significant boards.

After making a change, it is best to re-plot the curve to be sure the desired affect was obtained.

THIRD 'A' BOARD ADJUSTMENTS

The Z1 pot on the 3rd 'A' board will move the sections from [1] to [2], [7] to [8], [9] to [10], and [15] to [16] as shown in Figure 90031.

Moving the Section [1] to [2] will affect the other sections in a like manner. Thus, if the transition width 'W' for the third board was to be widened by 1 mV, a 1 mV change with the Z1 would be required. This adjustment must be made from the proper side, i.e. the code at pt [2], [7], [10] or [15].

The Z2 is used to widen Sections [3] to [4], [5] to [6], [11] to [12], and [13] to [14]. These voltage inputs must correspond to the pt [3], [6], [11], or [14]. The amount of change made will be the amount that

the transition width is widened or narrowed, reference Figure 90031.

NOTE: In Figure 90031 and 90032 that changing W at -3/4 scale (-7.5V) causes an equal change at +/- 2.5V (1/4 scale) and +7.5V (+3/4 scale) points. It also affects zero transition widths.

(b) Z1:

The Z1 adjustment is only used where positive voltage is at the input of the third A board. It is used at the +/- 1/4 & 3/4 scale points but may only be adjusted one side of the transition. At 3/4 scale points [2] or [15] must be used. At 1/4 scale points, [7] or [10] must be used. If the -7.5080 transition is changed to -7.5085 or .5mV more negative then the -7.4877 transition is unaffected and the transition width W increases from -.8 to -1/3 mV error. Example: Figure 90032. If the -7.5080 transition is changed to -7.5072 the width W becomes 'O' as in Figure 90032.

(c) K1:

The K1 adjustment changes slopes per Figure 90033B or 90033C. The adjustment is made from the end points: [1] or [16] or center points [8] or [9].

Example Figure 90033B:

At [1] -9.9877 is increased to -9.9867 or 1 mV more positive with K1

pot.

NOTE: The 3rd A K1 pot affects the zero transition width. In Figure 90033B it increases the transition width. The same change would result from adjusting points [8] or [16] 1 mV negative or point [9] 1 mV more positive.

Figure 90033B shows the opposite direction change.

NOTE: K2 shows a gain slope change where Z2 and Z1 adjustments show an offset change.

(d) K2:

The K2 adjustment changes slopes per Figures 90034B and 90034C. Adjustments are made from 1/2 scale transition.

EXAMPLE: Figure 90034B is obtained from 90034A by going to point [4] or [12] and adjusting K2 for about -.6mV more error, or going to point [5] or [13] and adjusting for a positive .6mV error increase. This adjustment changes the width of the +/- 1/2 scale transitions.

SECOND 'A' BOARD ADJUSTMENTS

Adjustments are similar to the 3rd 'A' board but are made at different points.

The Z1 and Z2 potentiometers are used to correct +/- 1/2 scale transitions. The affects are shown on Figure 90035B and 90035C.

If the -5.0080 transition is changed with the Z1 pot to -5.0084 (-.4mV) the -4.9877 transition does not change. This widens the transition by the amount of change made.

The Z1 adjustment, like the 3rd board, must be made at the side of the transition with a positive voltage into the board. In this case point [4] transition or the point [13] transition. The K2 adjustments are made at points [5] and [12]. The K1 adjustments are made at the +/- f/s transitions (90037 B,C). The K2 adjustments are made at the +/- zero transitions (90038 B,C).

FIRST 'A' BOARD ADJUSTMENTS

Z2 pot offsets the half of curve with the negative voltage input per Figure 90039B. The Z1 adjustment offsets the half of the curve with positive voltage into the board (90040 B,C).

This means with an inverting buffer between the input and the first 'A' board that the negative transition (normally zero -.0080 for example) is used.

The K1 potentiometer pivots the half of the curve with a positive input to the 1st 'A' board about zero. The corresponding full scale transition is used for adjustment. Reference Figures 90041B and C.

The K2 potentiometer pivots the half of the curve with a NEGATIVE input to the 1st 'A' board. The corresponding full scale transition is used for adjustment. Reference Figures 90042B and C.

For future temperature checks run a 16 point linearity and mark it 25 C.

HIGH TEMPERATURE

(a) Raise the ambient temperature of the system to 50 C or 55 C as required. Allow the unit to soak at this temperature for a minimum of 1/2 hour.

(b) Run a 16 point linearity curve plus the transition points around +/- 7/8th scale. (Refer to 16 point linearity).

(c) Compare these results with the room temperature curve. Using the available drift potentiometers, Z1 and Z2, make adjustments to return the high temperature results to the results obtained in the 25 C run.

At high temperature the DRIFT potentiometers on the 'A' boards allow corrections to be made corresponding to room temperature Z1 and Z2. Adjustments are made starting with least significant bit (usually the A4 board at a 1/8 scale transition) towards the msb (A1). The curve is adjusted to be as close as possible to the one at room temperature.

In addition to the 'A' boards, the buffer/or sample-and-hold have zero

drift potentiometers and the +/- reference power supply have drift potentiometers to correct their outputs.

The buffer (sample-and-hold) drift potentiometers shift the entire curve in the same manner as Figure 90043B. Since it may not be possible to seperate ADC drift from buffer drift, it is sometimes more expedient to attach a wire to the buffer output to a voltmeter. At room temperature, the buffer can be set for a '0 volts in -0 volts out' state. At high temperature the buffer zero drift potentiometer can be used to repeat this condition. Remaining offset is then due to ADC which can be removed via the Z1 and Z2 drift potentiometers 1st 'A' boards.

In Figure 90044B the curve has been corrected to this point which includes an undesirable zero offset and could not be corrected to proper zero with the buffer drift potentiometer. However, this may not be the cause of drift. If the buffer is reset (as indicated above) to Zero Volts OUT with Zero Volts IN by the drift potentiometer, the true cause can be seen.

CASE I: If the curve then returns to room temperature position the buffer drift can cause offset.

CASE II: If not, the curve will still be offset in the same or some other position. The cause may be a combination of first A Z1 and Z2 shift and can be corrected with these drift potentiometers.

Suppose with the buffer drift set to Zero, the curve is approximately as shown (Figure 90044B). Zero transition points [8], [9] would be approximately

(8) -.0066 or +1mV error

(9) +.0137 or +1.4mV error

The 1st 'A' board Z1 and Z2 drift potentiometers can be used to offset the curve back around zero as follows:

First determine whether the buffer or S/H is inverting. The Z1 drift adjustment is only made with positive voltage into the 1st 'A' board and only affects the corresponding half of the curve. The Z2 drift adjustment affects the half of the curve with the negative polarity input. Reference Figures 90039B, 90040B and C.

If the buffer is inverting, adjust analog input for +0.123 volts which is the room temperature value (Figure 90044A). Adjust 1st 'A' TC2 potentiometer for ___*. This will bring the right half of the curve down 1.4mV to its proper position. Now adjust analog input for -.0080V. Use the 1st 'A' TC1 potentiometer and adjust for the proper code for the [8] transition -11111111110___*. The curve should as shown in Figure 90044A.

NOTE: With a non-inverting buffer the [8] transition would be corrected first. This would result in a curve like Figure 90044D. Using TC2 adjust point [8] is moved from -.0066 (+1mV error) to -00.80 (-.4mV error). The TC1 potentiometer can now be used to bring point

[9] back to its room temperature value.

Figures are normally plotted with errors at 1mV/div. Reading errors and input errors define 1mV/div as a good practical limit.

Figure 90045 shows a typical curve with +/- 7/8 full scale points plotted to check transition width set by 4th 'A' board.

The only adjustments that cannot be made at high temperature are the slope changes on the 'A' boards. Since slope changes do affect transition widths, 'over-corrections' with the Z1 or Z2 drift potentiometers must be employed. If these do not provide enough adjustment to bring the curve within tolerance, the unit should be returned to room temperature and the board(s) with problems should be repaired.

(d) Allow the unit to remain at this high temperature for at least 1/2 hour and repeat the curve to verify the stability.

ROOM TEMPERATURE CHECK

(a) Allow the unit to settle at room temperature for at least one hour.

(b) Repeat the 16 point curve and mark this 25 C #2.

(c) The results should be nearly the same as the one marked 25 C.

(d) If the room temperature curves are nearly the same as the high temperature curves, the temperature compensation is correct.

(e) If the curves are not the same, touch up the curves at room temperature and repeat the high temperature drift run.

LOW TEMPERATURE

(a) Record the curve for the room temperature.

(b) Lower the temperature to 0 C and allow at least 1/2 hour to settle.

(c) Plot the 16 point curve and verify that all points are within over-all tolerances.

(d) If an incorrect transition is obtained, but only a small amount, a determination of whether a drift adjustment should be made or the ADC should be returned to room temperature where the bit may be corrected by the regular zero potentiometer must be made. In either case, a rerun on high temperature must be made.

(e) Return ADC to hi temperature to dry out if moisture was present. Allow 1/2 hour minimum time to settle.

(f) Return ADC to room temperature and allow a 1 hour minimum time to settle. Repeat 16 point curve. If specific bit is to be widened, make

required adjustments to do this and others as required to correct curve.

SECTION 7

TROUBLE SHOOTING PROCEDURES

SYSTEM TROUBLE SHOOTING

This section describes the recommended procedures for trouble shooting the GM Series Multiplexing Analog-to-Digital Conversion System. The procedures have been separated into three major building blocks of the system i.e. (1) the power supply, (2) the multiplexer, (3) the analog-to-digital converter.

Prior to beginning the trouble shooting, make certain that all instrumentation associated with the system is checked to determine that the apparent problem is within the GM System. Check that all external addressing is correct and that the input/output, analog and digital lines are properly terminated.

Calibration adjustment potentiometers and capacitors are preset at the factory. No adjustment of these controls should be attempted until a check of the system has been made.

To prevent damage to the semiconductors the main power should be turned off before plugging or unplugging any circuit card.

In some cases, concerning the Sample-and-Hold Buffer Amplifier, timing board, or high resolution bit boards placing the board on an extender card will effect the normal operation of that board. All boards should be in their slots when any critical parameters are measured such as system timing, sample-and-hold adjustments and final calibration.

This system has a temperature sensitive switch mounted internally at the rear of the chassis. This switch is designed to interrupt the main power should the internal temperature of the system rise to 70 C. This temperature switch is self-resetting and will restore the power when the temperature is again lowered to 55 C.

GENERAL TROUBLE SHOOTING EQUIPMENT

Equipment recommended for trouble shooting consists of the following:

(a) A stable DC analog voltage source, variable over the range of +/- full scale input voltage or +/- 10 volts whichever is greater. The voltage resolution should be at least 25% of the least significant bit. The source impedance should be less than 1000 ohms.

(b) Oscilloscope, Tektronix 545A, with 1A5 and CA Preamplifiers, or equivalent.

(c) Five-digit digital voltmeter, differential voltmeter, or equivalent. The accuracy should be at least twice that of the system being tested.

(d) Triangle wave generator with a capability of 20 volts peak-to-peak into a 470 ohms load at 1 kHz.

(e) VOM such as Simpson 260.

(f) Pulse generator to provide clock pulses of an equivalent in amplitude width and frequency to the normal system operating pulses.

(g) Printed circuit card extender, bit board extender (Part No. 52315) and Sample-and-Hold Buffer extender (Part No. 52318). All three are supplied with the unit. (Part No. 52315 and 52318 may be replaced by a single extender Part No. 52330.)

FAULT INDICATION	POWER SUPPLY CHECK
Loss of Power	Line fuse, power, ON-OFF Switch, High temperature which may have caused temperature sensor to remove power.
Loss of Display	Assuming that the ADC is operating correctly, and the failure is other than an individual LED, the lamps are connected through resistors to the common 5 volt supply. Check the 5 volt supply. The display is accomplished by using an LED device, they are driven by the output data through inverters mounted on the lamp display board. To turn the lamp on the inverter output must go false. Check both input drive to the inverter and the output of the inverter. If the above checks prove "OK" then the lamp is at fault.

Non-Operating System

First check to see that all plug-in boards are seated properly. If the above check has been made and the problem still exists make a check of the plus and minus 10 volts and the plus and minus 33 volts. Refer to Figure 90049 for these test point locations.

ADC PROBLEMS AND POSSIBLE SOLUTIONS

Refer to the Block Diagram, Figure 90047 for a flow-chart relating to ADC problems and their solutions, by category.

Faulty Positive Reference Power Supply

The reference power supply provides a precisely regulated, highly stabilized reference voltage for use in the ADC bit boards. It consists of two differential amplifiers. Each is an operational amplifier with its own feedback loop. The primary standard reference is a zener diode. The reference control -10v adjusts the output voltage of the minus supply and the +10v control adjusts the output voltage of the plus supply.

A faulty positive reference supply will have the following indications:

(a) An error in the digital information (gain error).

(b) A zero offset which cannot be removed with front panel adjustment.

Check the +10 volt reference supply at the test points on the circuit board. It should be adjustable with the gain potentiometer located on that board and labeled +10v.

Faulty Negative Reference Supply

A faulty negative reference supply will give a Zero error, except that the Gain will not be affected. Make the same checks as above using the negative test point (-10v) and adjustment potentiometer (REF).

Incorrect Calibration of Buffer or Sample-and-Hold Amplifiers

Incorrect data and zero offsets may be due to adjustments in the analog area of the ADC such as the buffer or the Sample-and-Hold Amplifiers.

Check the calibration of the buffer or Sample-and-Hold Amplifiers to see if the problem exists in this area.

Defective Bit Board

An incorrect digital output may be caused by an uncalibrated bit board or by some malfunction of a bit board.

Check the bit board in question by using the calibration procedure described in Section 6 (only that portion describing the method for introducing a signal into the bit board in question on the plain extender, Part No. 48289), so that test points of individual parts on the board may be available.

Introduce a 1000 Hz triangular wave of a peak-to-peak value of 20v (see Figure 90048) into the bit board and view the output of the board at

A1 and A2.

Trigger the ADC for a conversion at a rate of 10 kHz. The result is shown for a good board in Figure 90048. Also refer to Figures 90013 and 90014 for clarification.

TROUBLESHOOTING THE MULTIPLEXER CARD

Refer to Section 2 of this manual for the operation of the multiplexer switch and its associated circuitry. Decide whether the problem which exists is isolated to a particular channel or is common to all multiplexer channels.

Each multiplexer card has its own power regulator and is independent of the other multiplexer cards in this respect. If a particular channel is not functioning, or if only one channel is operating correctly, manually select that channel and monitor the multiplexer drive (see Figure 90010), check to see that the proper drive signal appears at this test point.

If a drive signal appears at this point, trace the drive and check to see that the correct drive appears at the gate of the FET. The gate is held at a negative potential when the FET is in the OFF state and when it is turned ON, the FET gate is allowed to slew to the same potential as the input signal of the multiplexer.

If the negative potential that holds the gate in the OFF state is

functioning properly and the gate does not assume the potential in the input signal, the problem is probably associated with the unity gain amplifier (see Figure 90010).

If all of the above items checked are functioning correctly, the problem is probably a defective FET semiconductor.

SPECIFIC MULTIPLEXER PROBLEMS

Below are some problems that may occur. The problem may affect the entire unit and symptoms may appear on all channels, but are caused by a single channel.

Shorted FET Semiconductor Switch

A FET switch that is shorted or fails to turn off completely will provide added analog information to the multiplexer output. If the unit is an ADC/MUX combination, the information out of the ADC will be erroneous and it may appear that the ADC is at fault. When a shorted FET switch is encountered, it may not be immediately apparent. The front panel indication may function correctly and the logic associated with the shorted FET switch may operate correctly, but the analog information on the multiplexer will be incorrect due to the addition of the information of the defective channel.

Open FET Semiconductor Switch

The front panel indication of a selected channel will not always mean that a particular channel is operating properly.

To check the operation of a single channel, move the MODE switch to the SEQUENTIAL TEST MANUAL position. Set the MUX ADDRESS to cover all channels. Bus all inputs to the same known analog input and monitor the multiplexer output. Manually sequence through each channel, noting that the proper analog signal appears on the multiplexer output for each channel selected. When the correct signal fails to appear on the multiplexer output, the defective channel has been located. Make sure that the test for correct drive for that channel has also been made.

SECTION 8

ILLUSTRATIONS

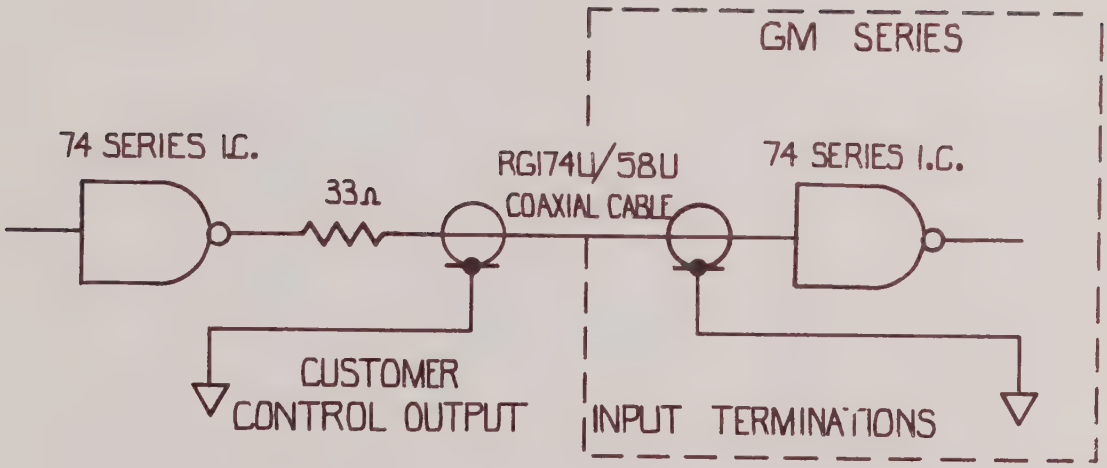


FIGURE 90000

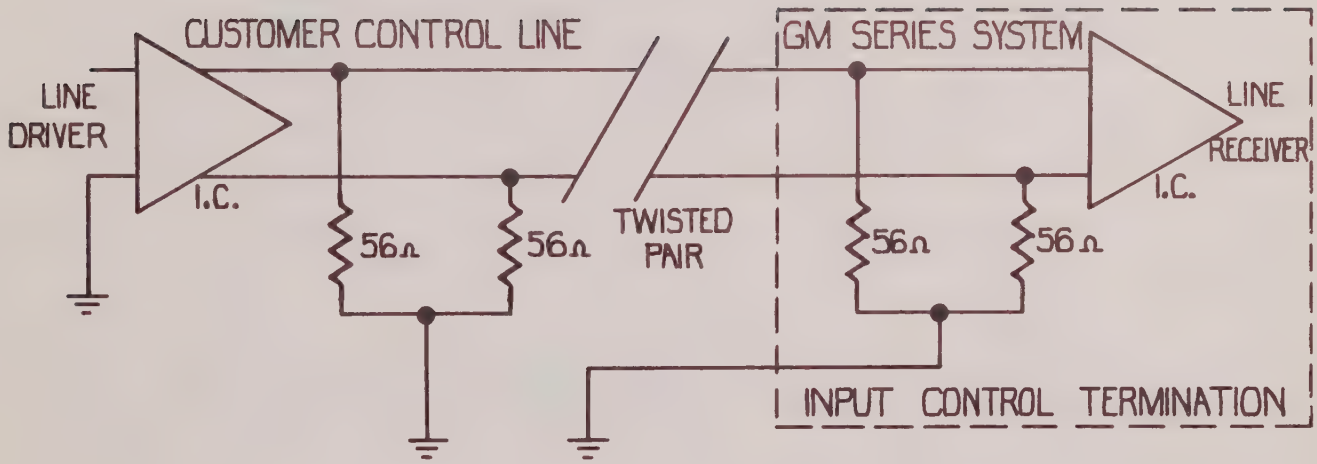


FIGURE 90001

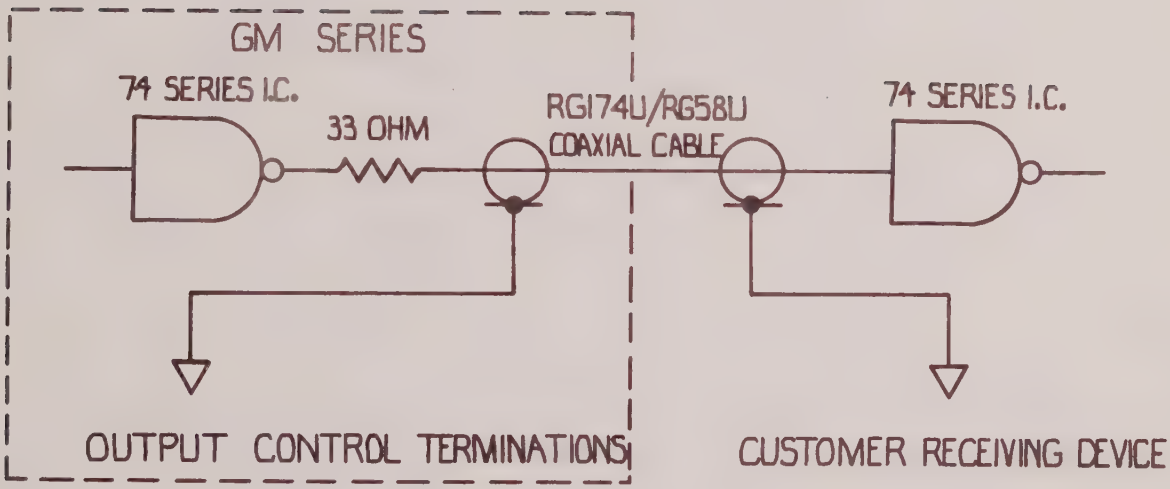


FIGURE 90002

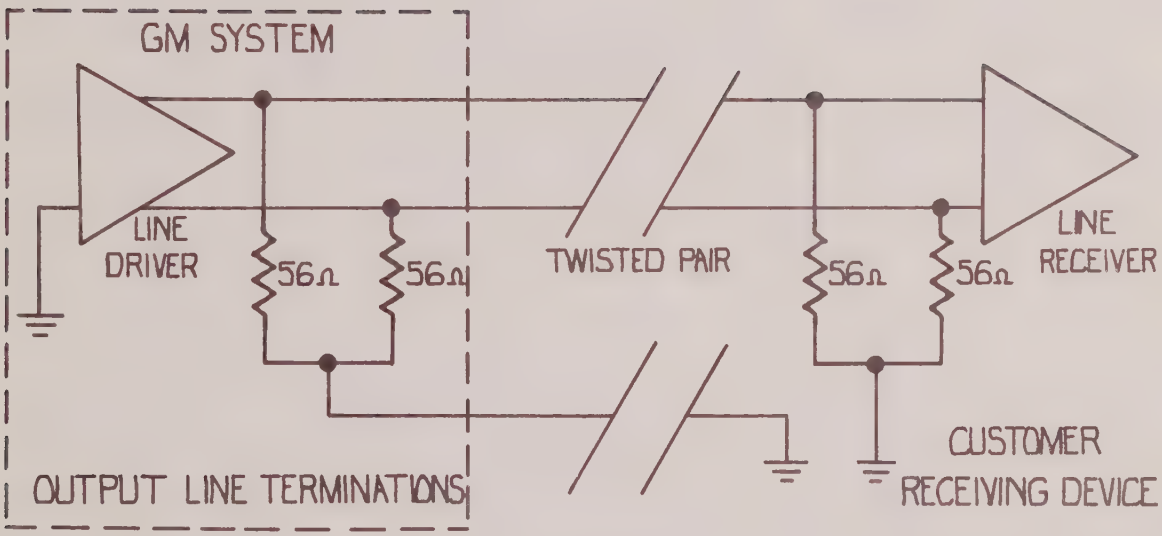


FIGURE 90003

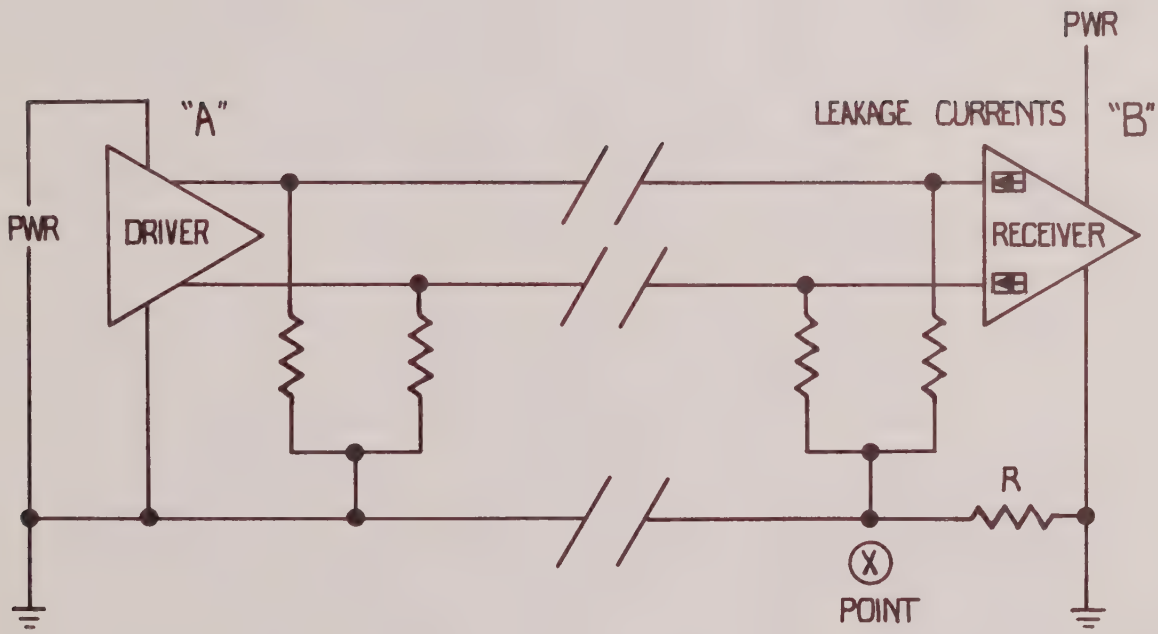


FIGURE 90004 Common Mode Terminations

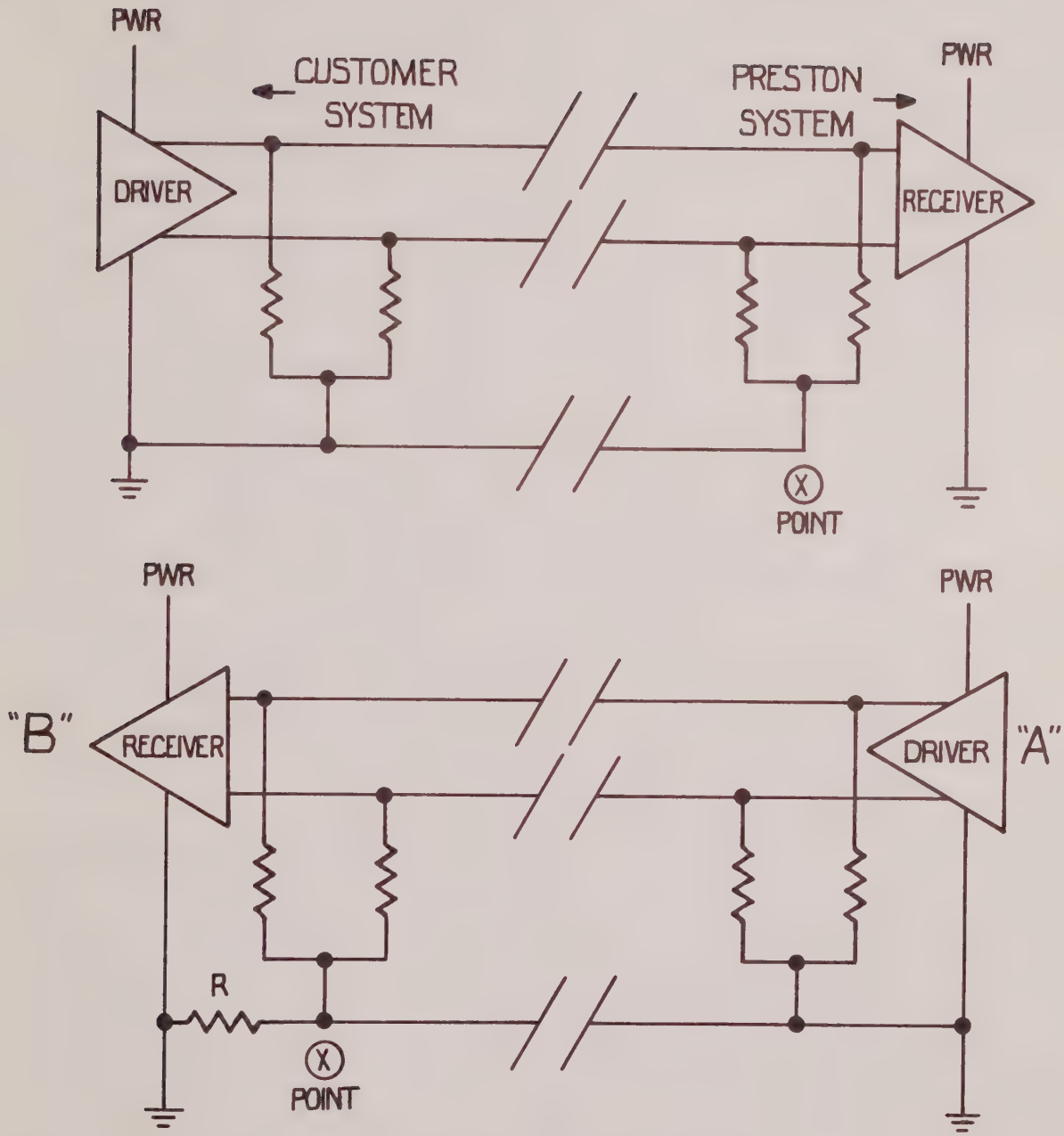


FIGURE 90005 Common Mode Terminations
Two-way Communications

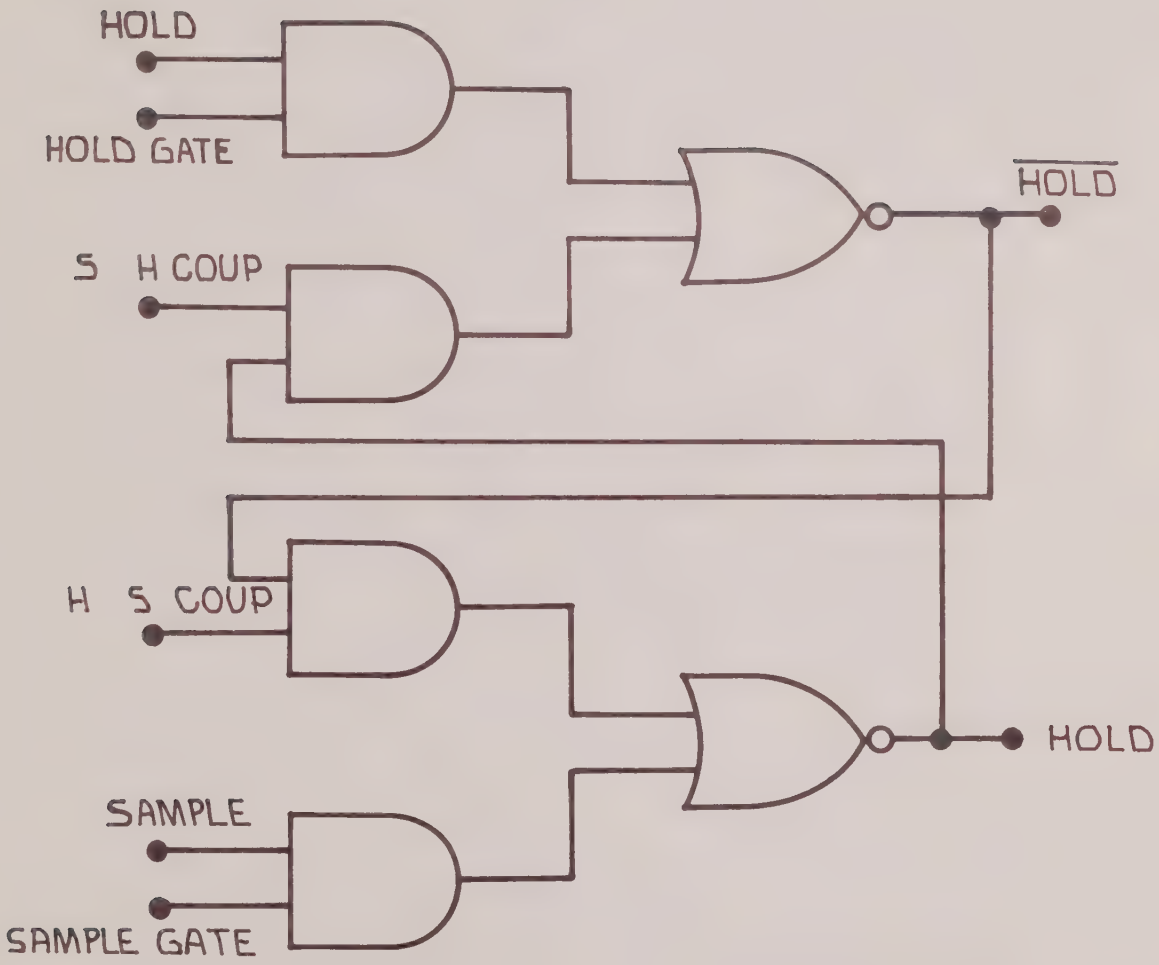


FIGURE 90006

	HOLD	HOLD GATE	SH COUP	SAMPLE	SAMPLE GATE	HS COUP
PULSE TO SAMPLE	D	T	T	D	T	T
PULSE TO HOLD	T	D		T	D	
DRIVE TRUE FOR SAMPLE	X	0	T	D	T	F
	0	X		T	D	
DRIVE TRUE FOR HOLD	D	T	F	X	0	T
	T	D		0	X	

X = UNUSED

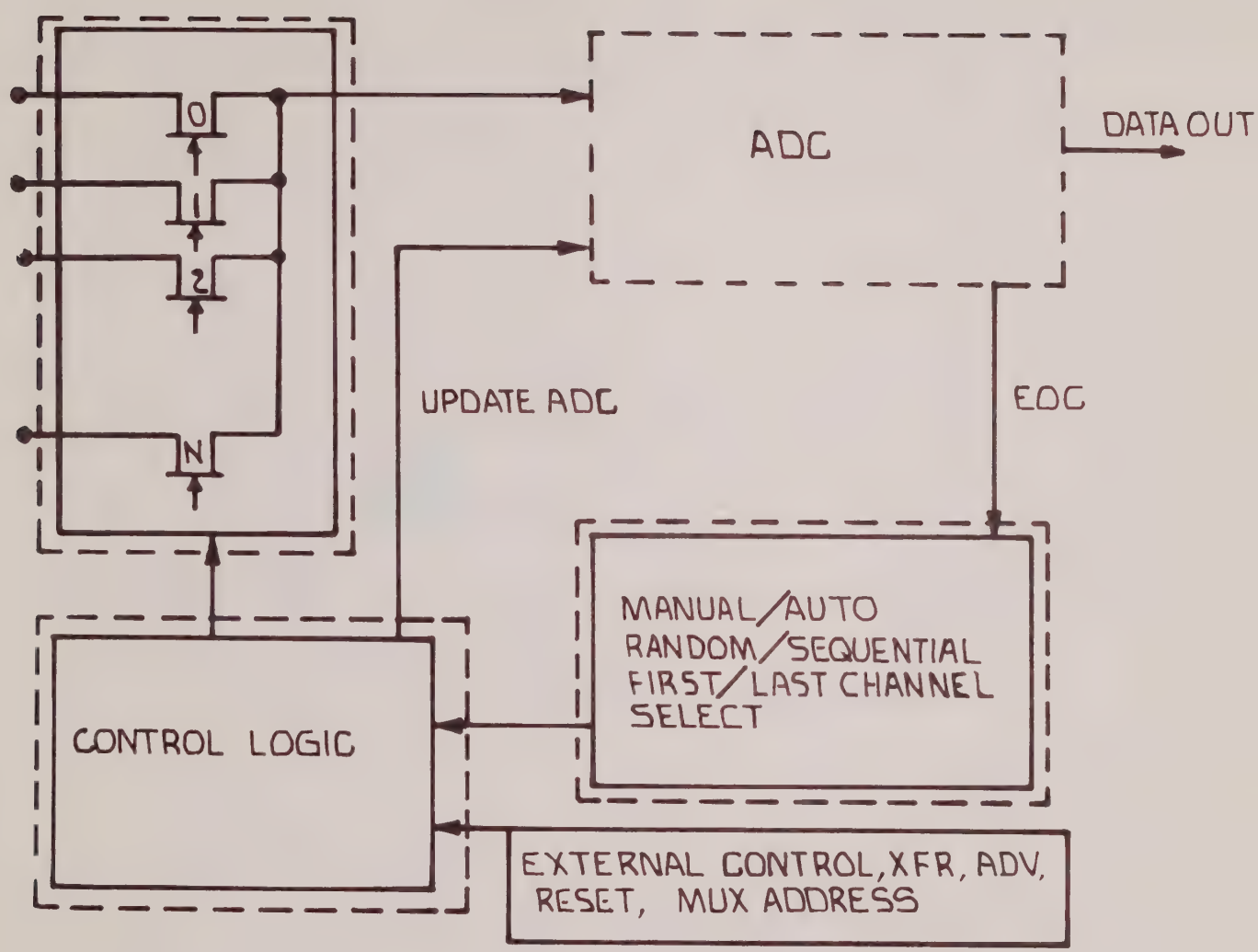
0 = KEPT AT LOW LOGIC LEVEL

T = TRUE

F = FALSE

D = DRIVE

FIGURE 90007



DOTTED LINES INDICATE THE MULTIPLEXER AND ITS CONTROLS MAY BE MOUNTED IN THE SAME MODULE AS THE ADC OR MOUNTED IN A SEPARATE MODULE DEPENDING UPON CUSTOMER REQUIREMENTS

FIGURE 90008
MULTIPLEXER MODULE
BLOCK DIAGRAM

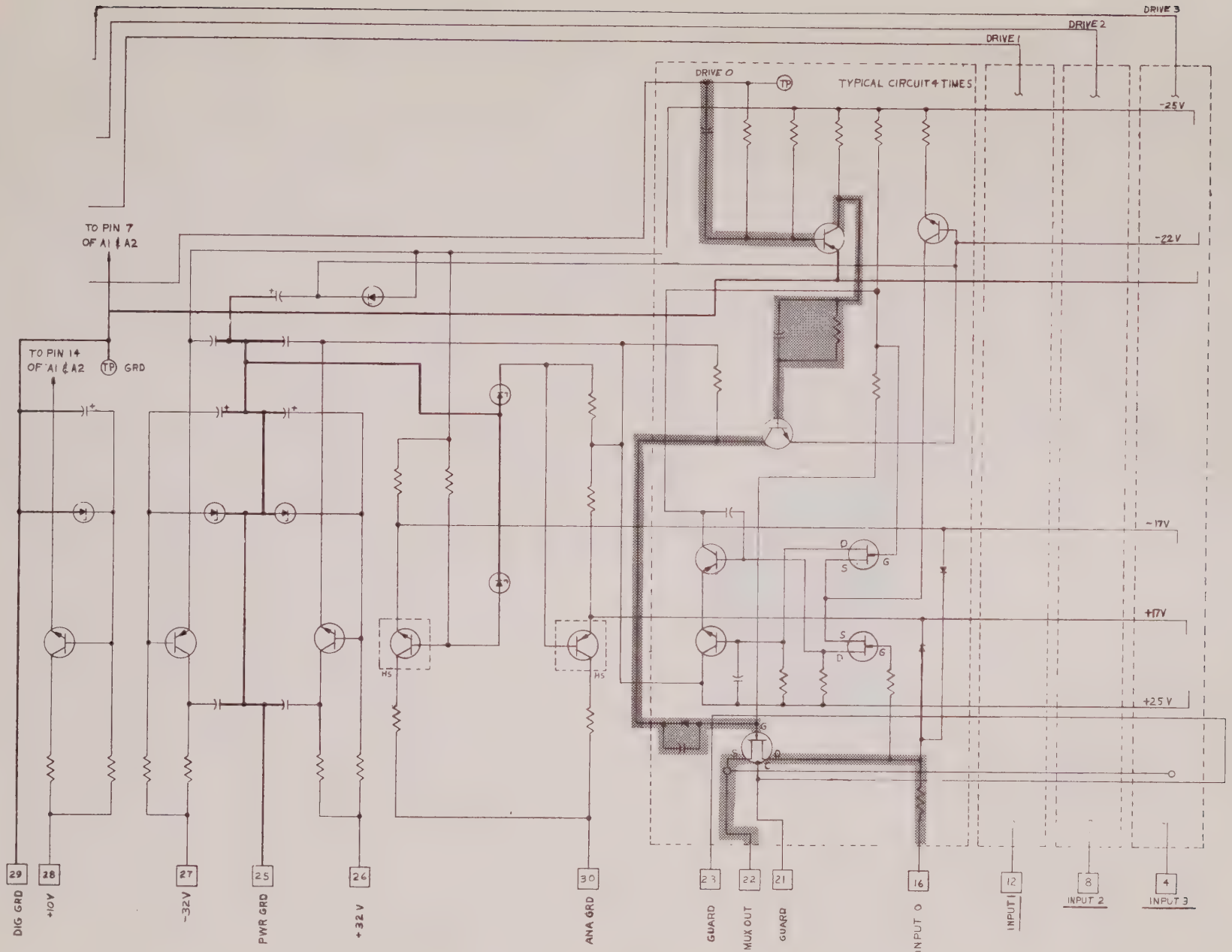


FIGURE 90009

MULTIPLEXER SWITCH

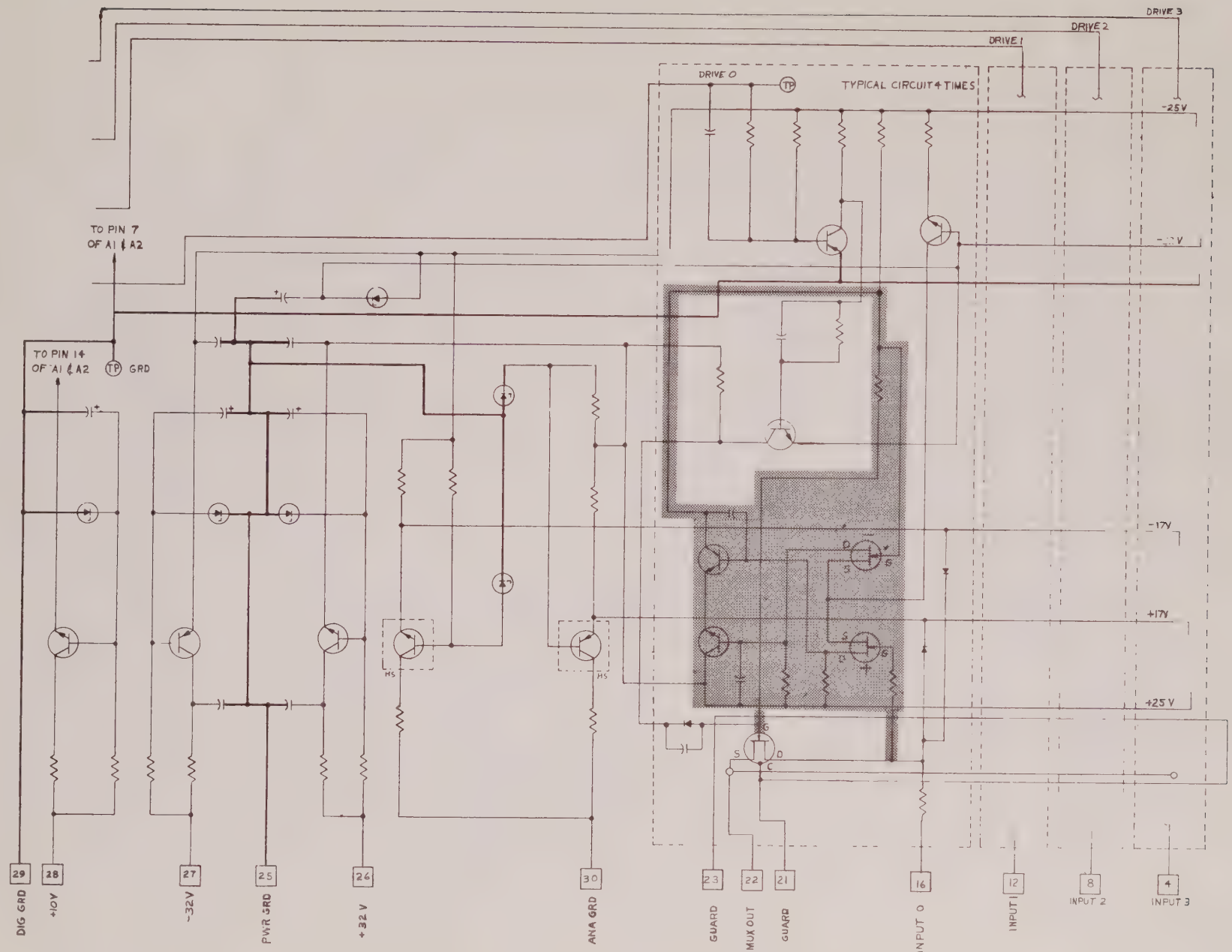


FIGURE 90010
UNITY GAIN AMPLIFIER

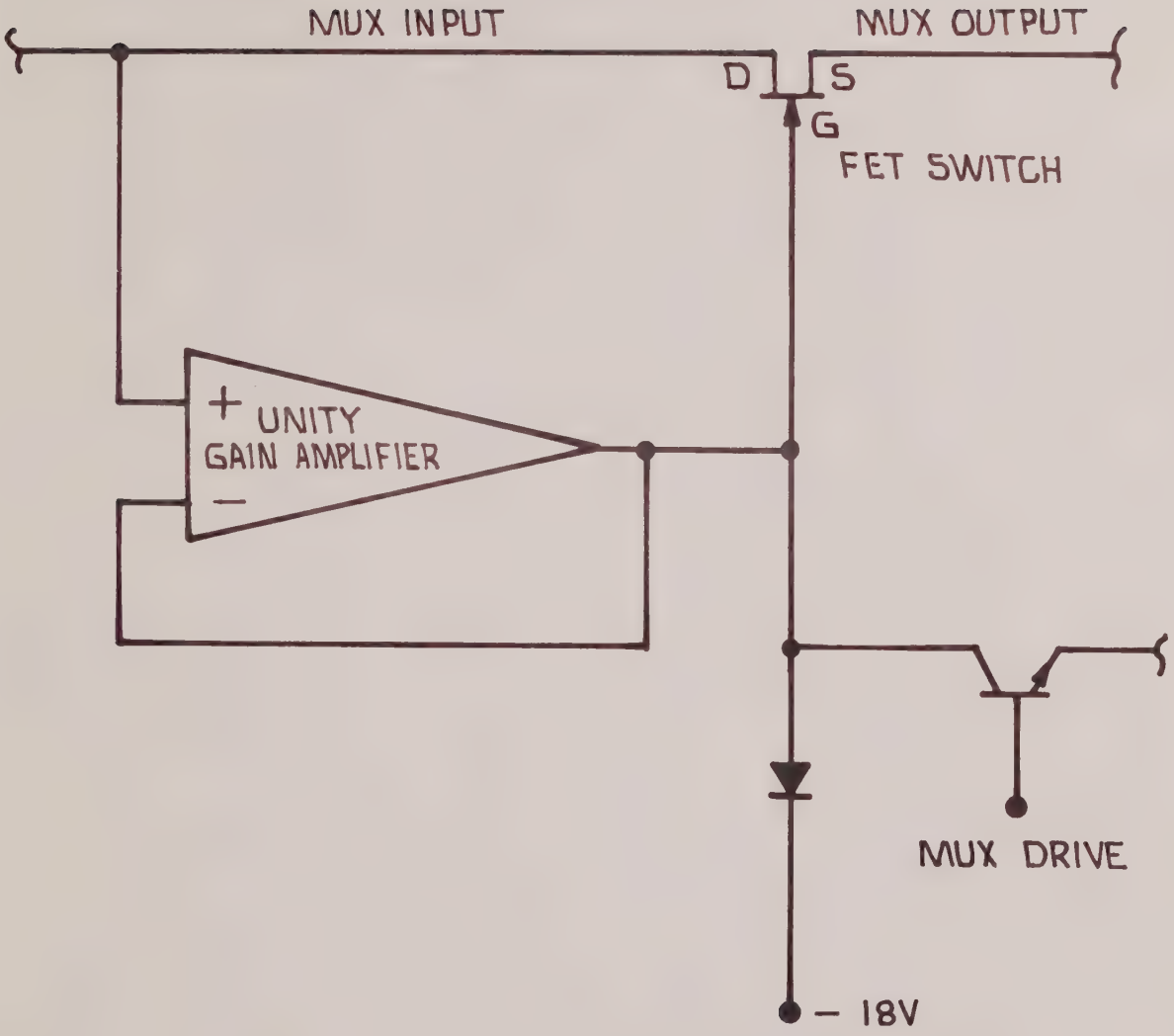


FIGURE 90011
MULTIPLEXER SWITCH
BLOCK DIAGRAM

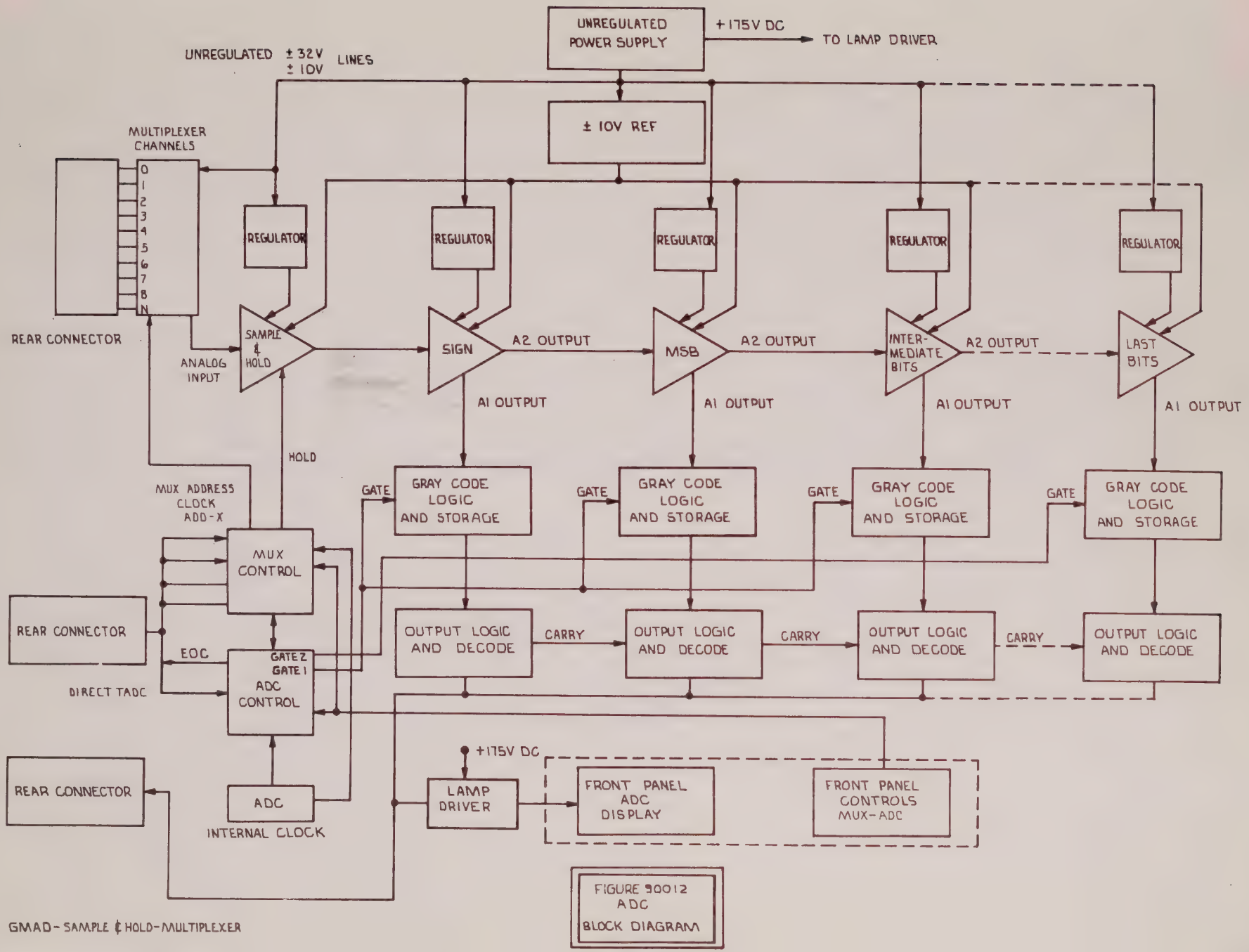


FIGURE 90012
ADC
BLOCK DIAGRAM

GMAD - SAMPLE & HOLD - MULTIPLEXER

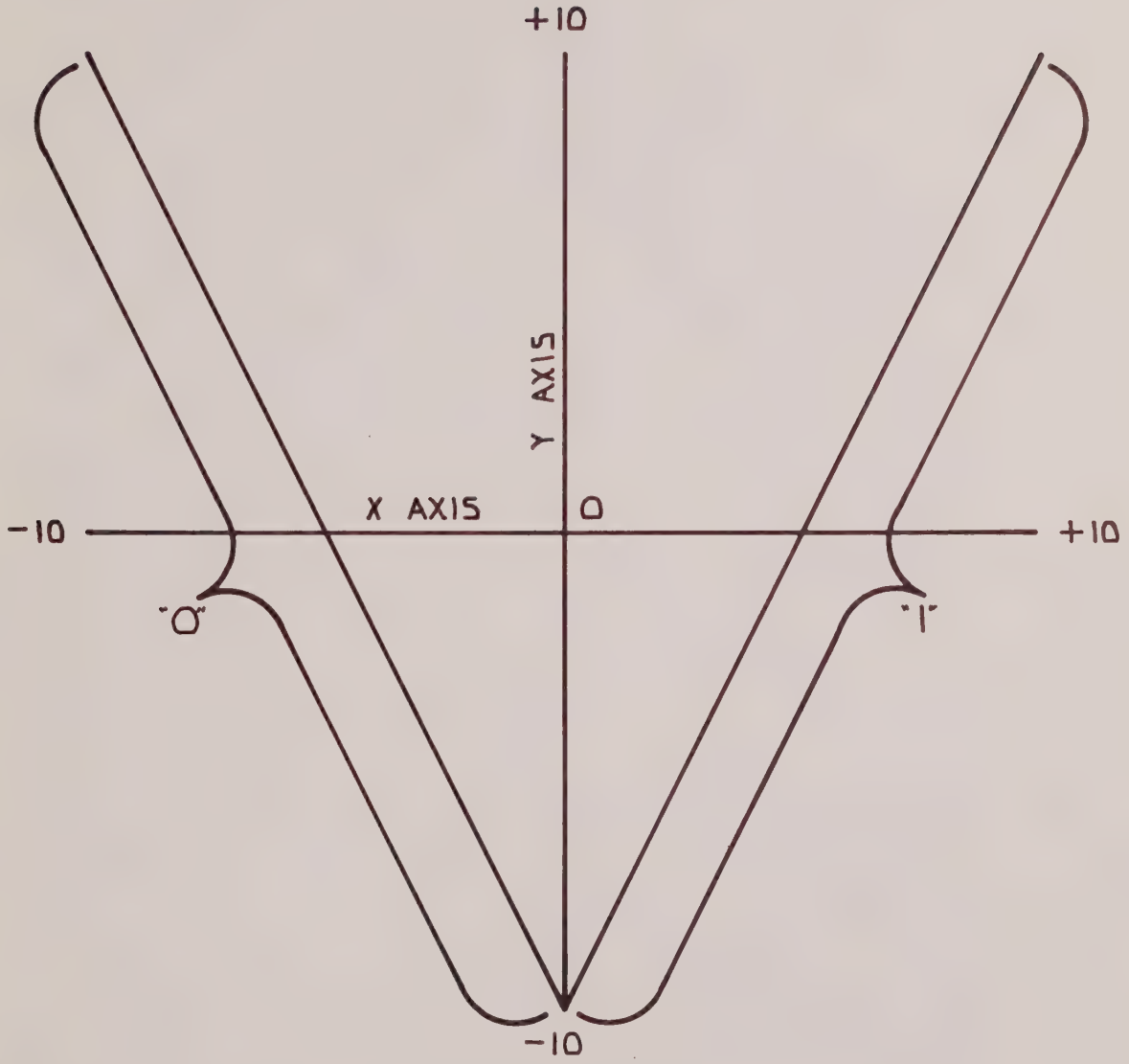


FIGURE 90013

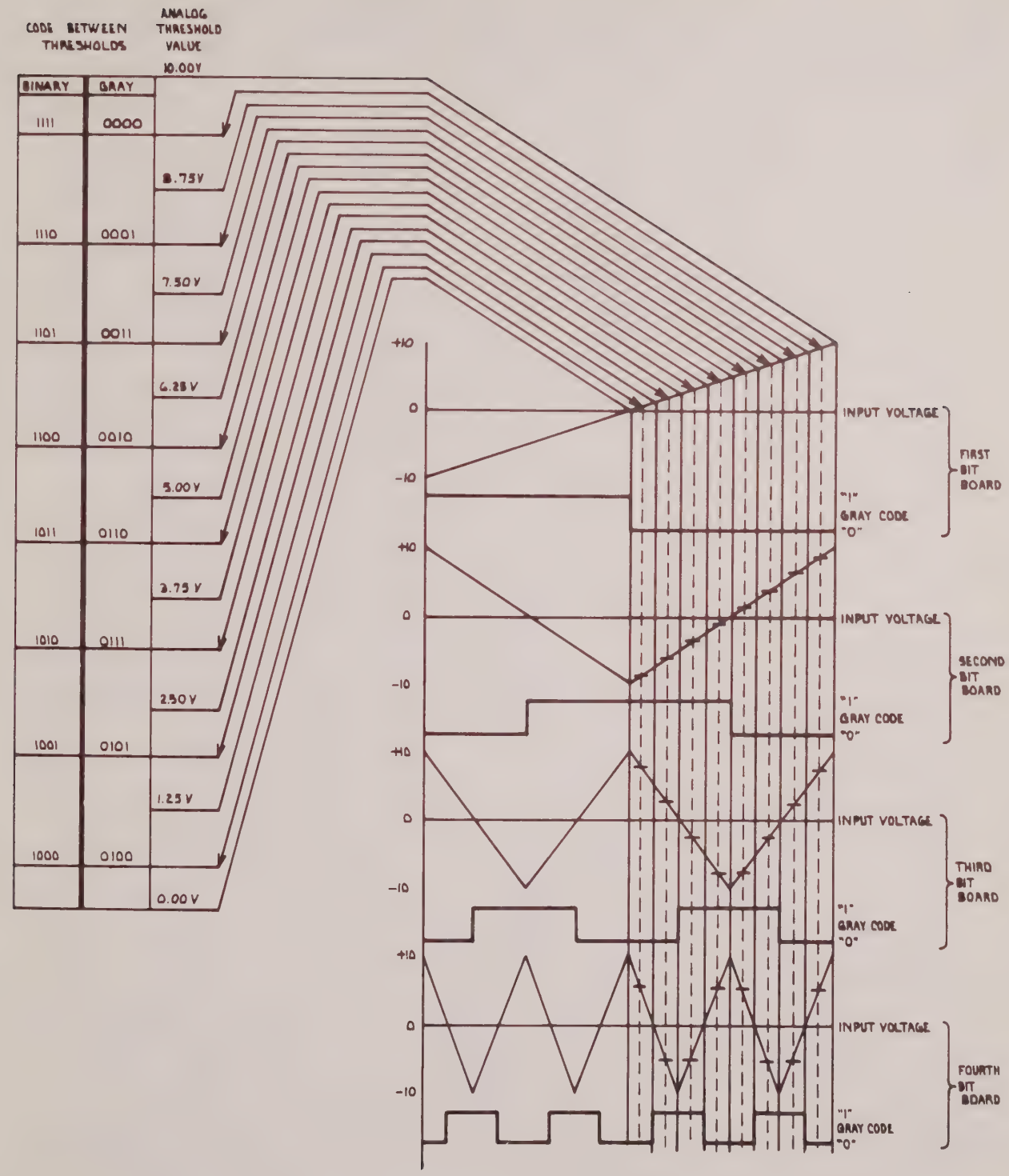


FIGURE 90014

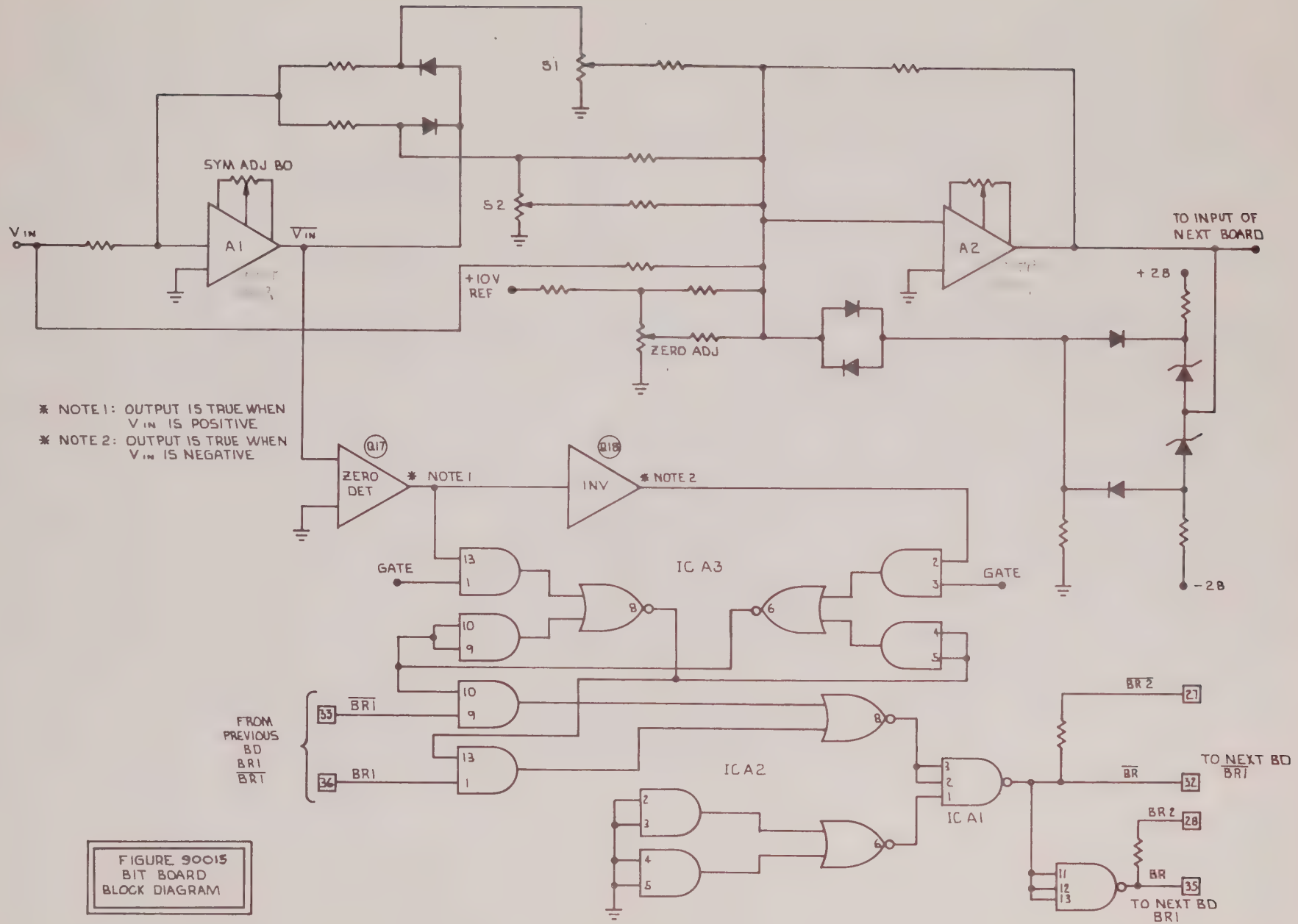


FIGURE 90015
BIT BOARD
BLOCK DIAGRAM

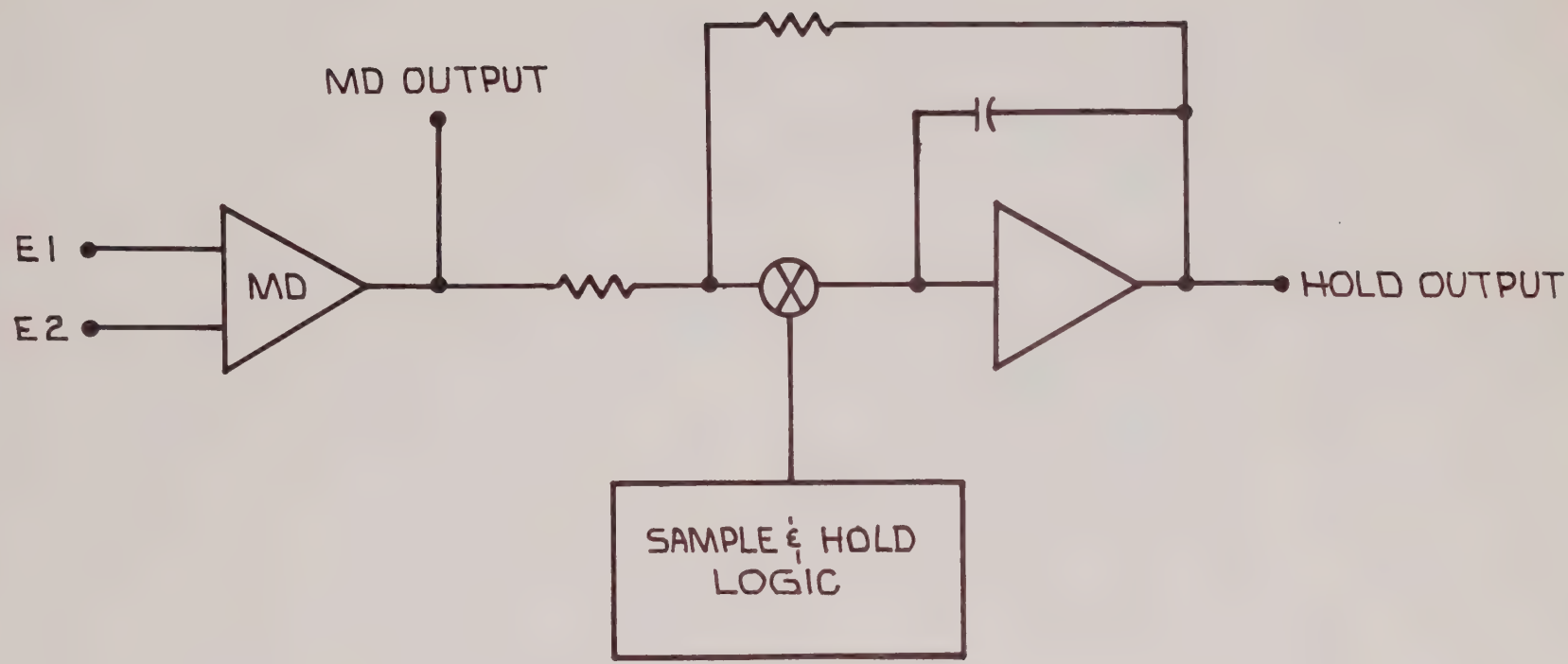
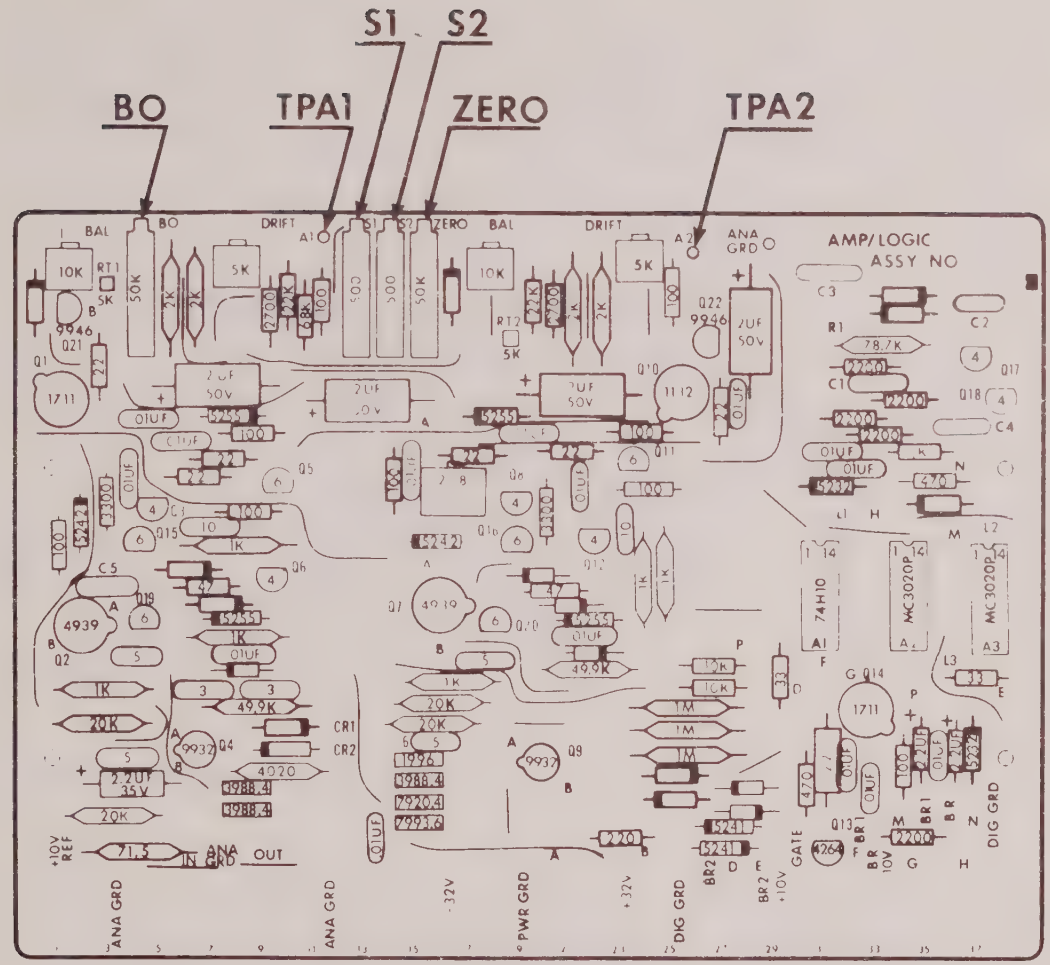


FIGURE 90016

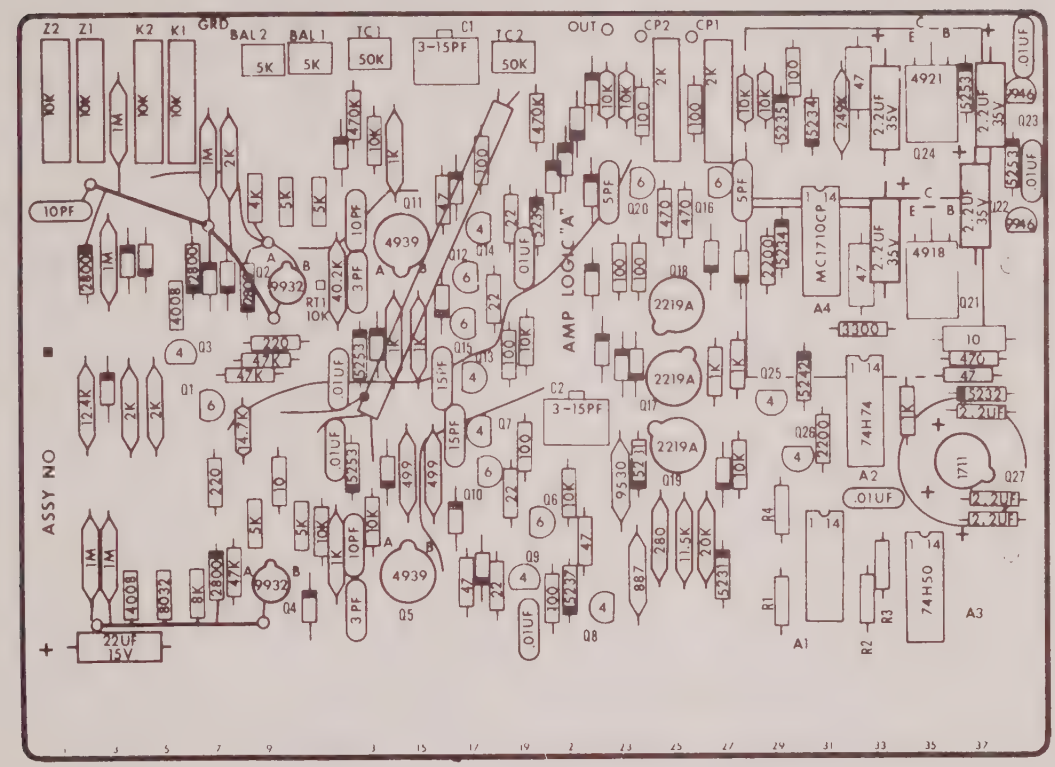


POTENTIOMETER LOCATION

BIT BOARD - AB, B OR C

FIGURE 90017

Z1,2 K1,2 TEMPERATURE ADJ



POTENTIOMETER LOCATION

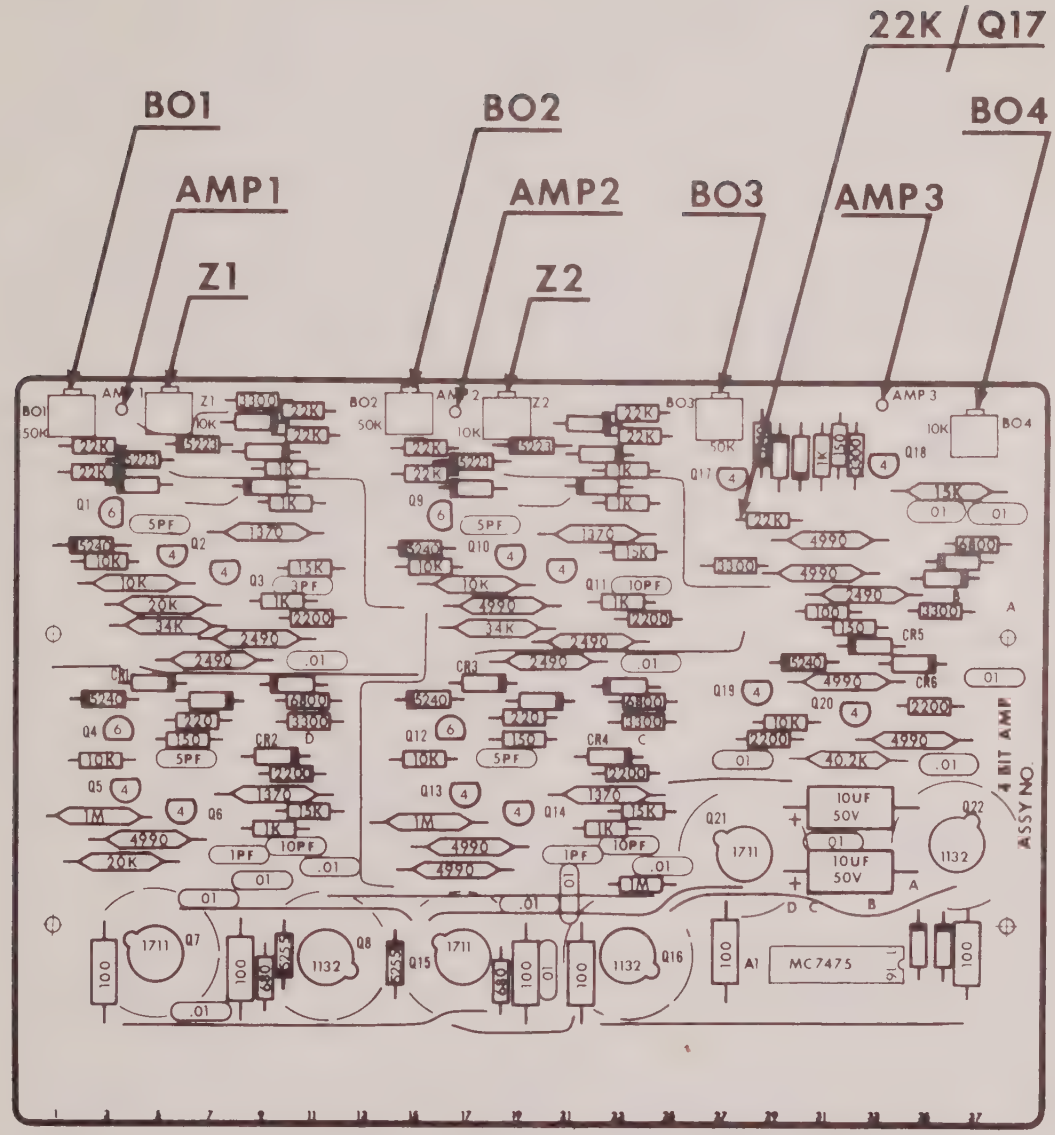
Bit Board "A"

FIGURE 90018

FRONT PANEL INDICATORS 8, 4, 2, 1	THEORETICAL INPUT (volts)	ACTUAL INPUT (volts)	ERROR
0000/0001	+8.75	_____	_____
0001/0010	+7.5	_____	_____
0010/0011	+6.25	_____	_____
0011/0100	+5	_____	_____
0100/0101	+3.75	_____	_____
0101/0110	+2.5	_____	_____
0110/0111	+1.25	_____	_____
0111/1000	0	_____	_____
1000/1001	-1.25	_____	_____
1001/1010	-2.5	_____	_____
1010/1011	-3.	_____	_____
1011/1100	-5	_____	_____
1100/1101	-6.25	_____	_____
1101/1110	-7.5	_____	_____
1110/1111	-8.75	_____	_____

FOUR BIT LINEARITY

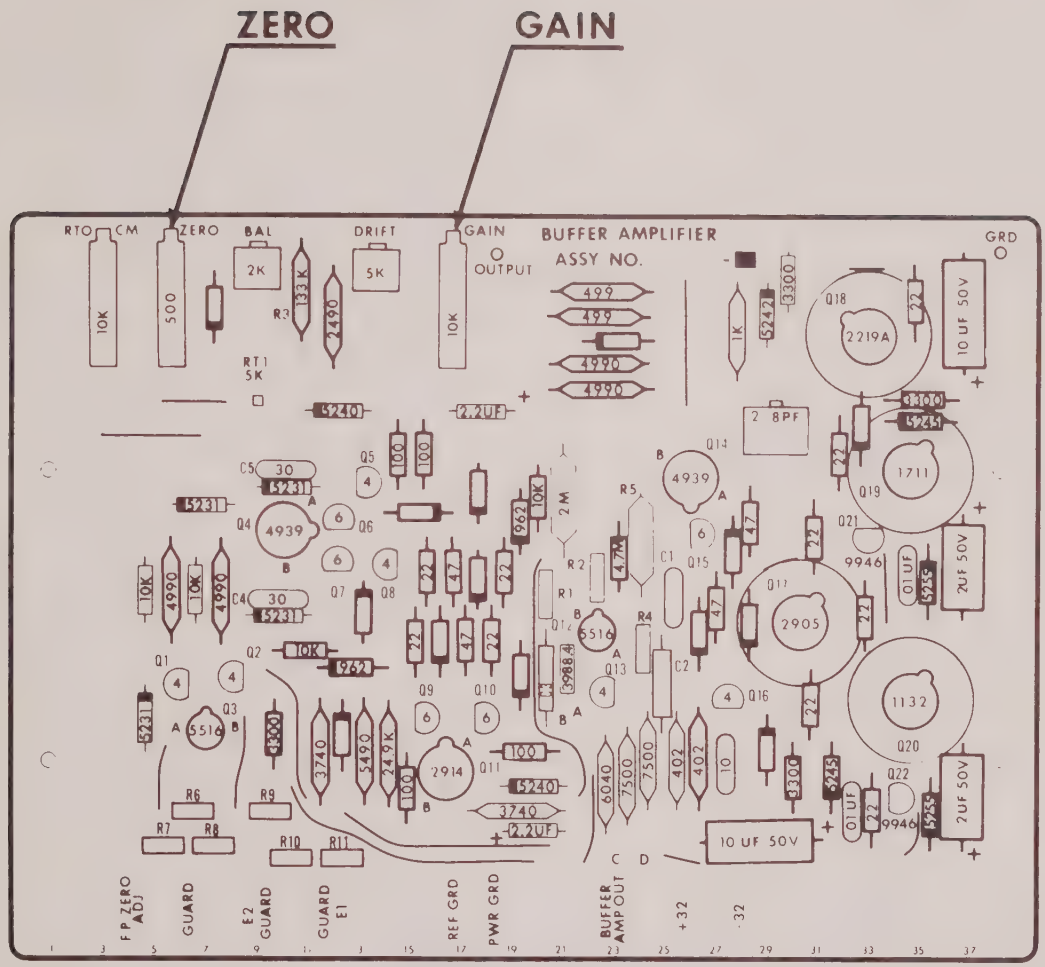
Figure 90019



POTENTIOMETER LOCATION

4-BIT AMPLIFIER

FIGURE 90020



POTENTIOMETER LOCATION

BUFFER AMPLIFIER

FIGURE 90021

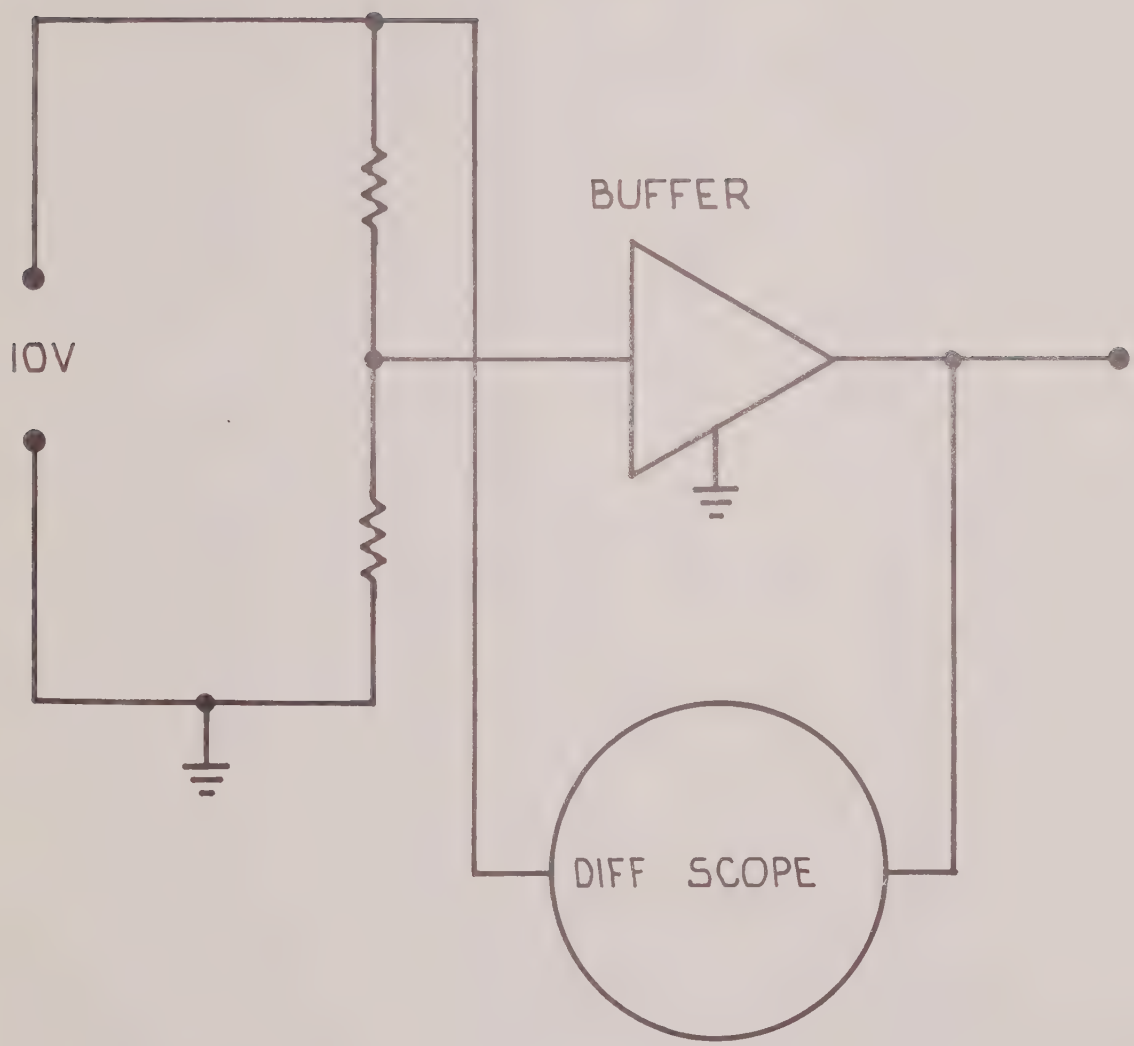


FIGURE 90022

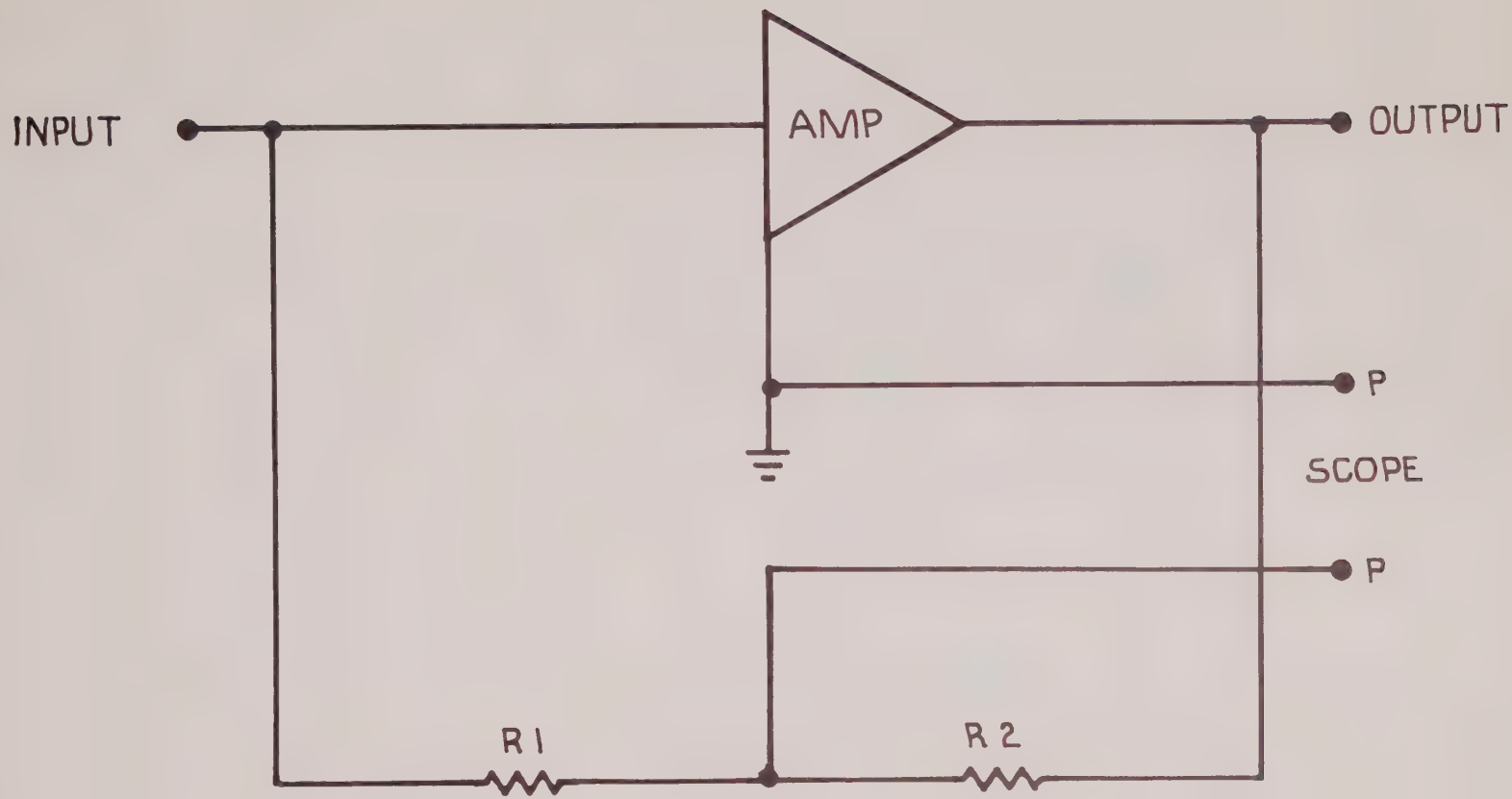
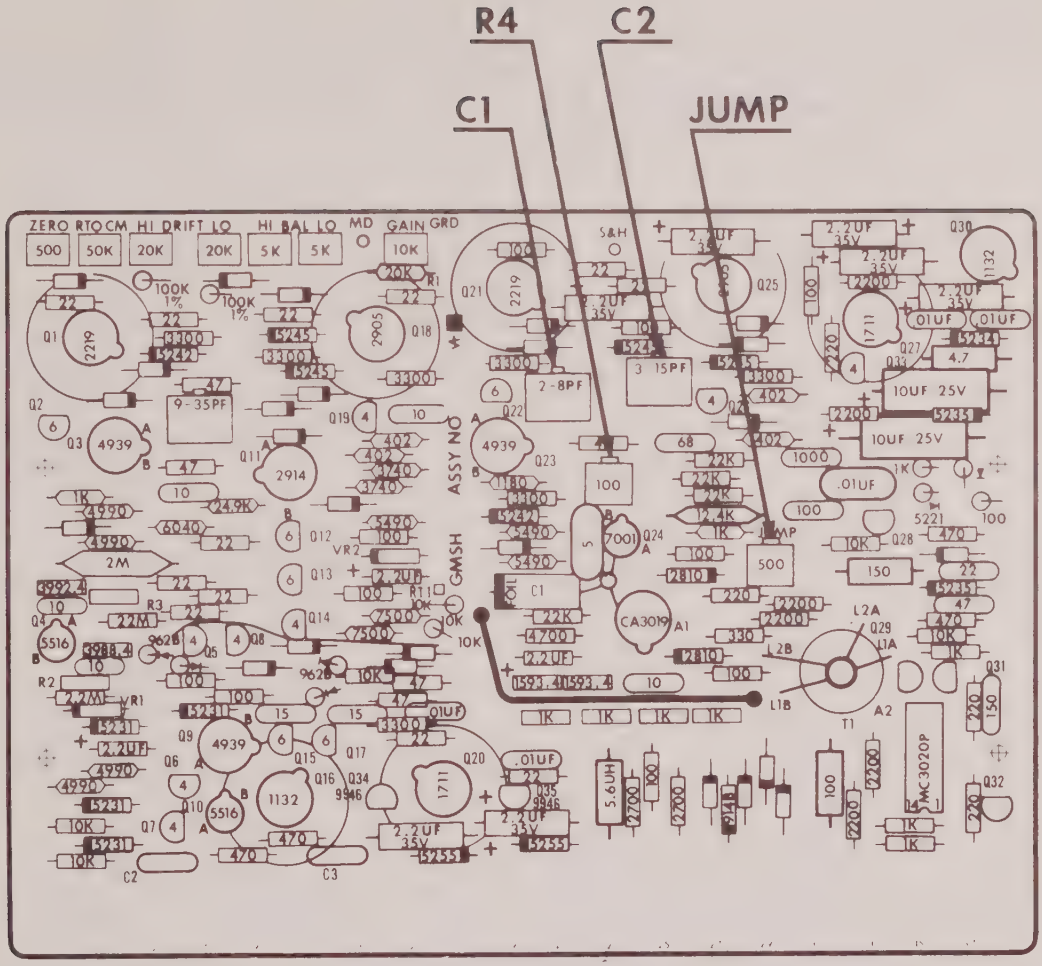


FIGURE 90023



SAMPLE-AND-HOLD AMPLIFIER

FIGURE 90024

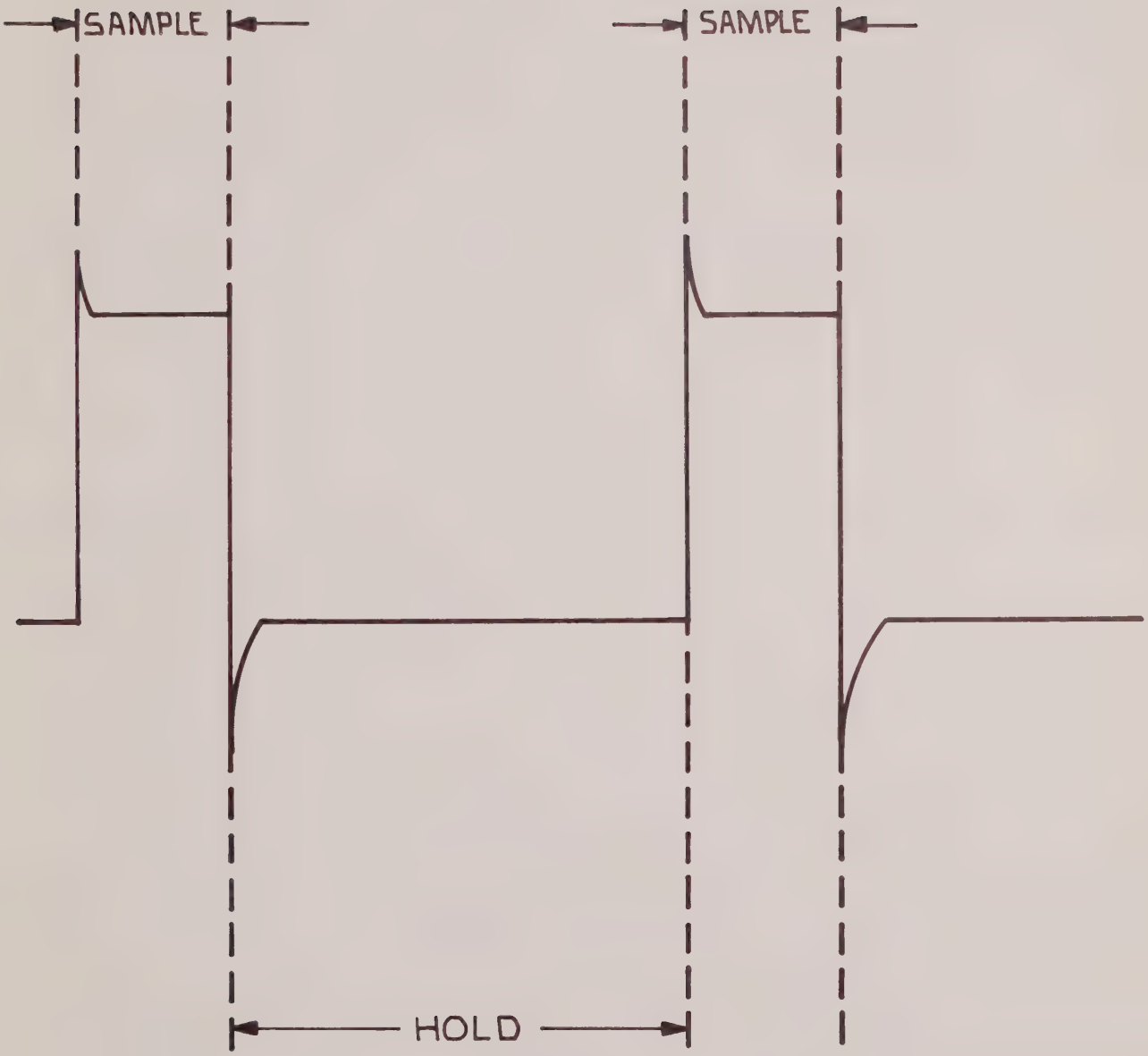


FIGURE 90025

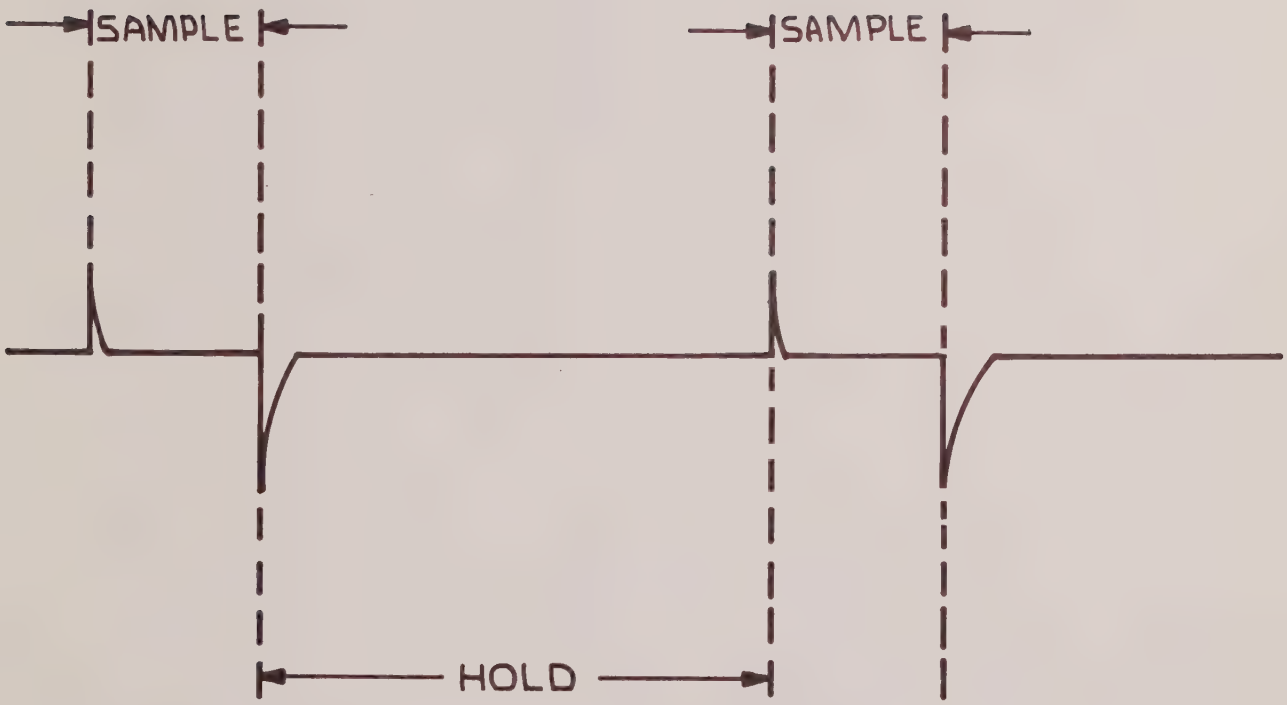
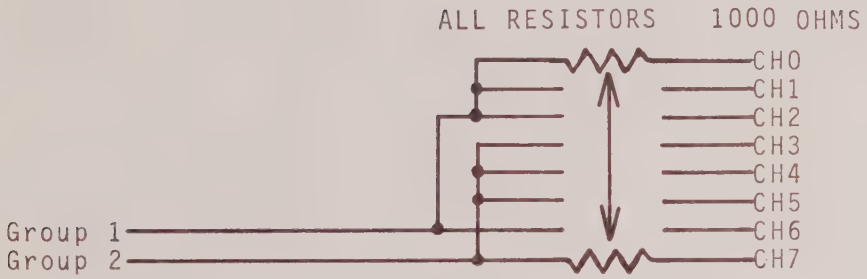


FIGURE 90026

SINGLE-ENDED INPUTS

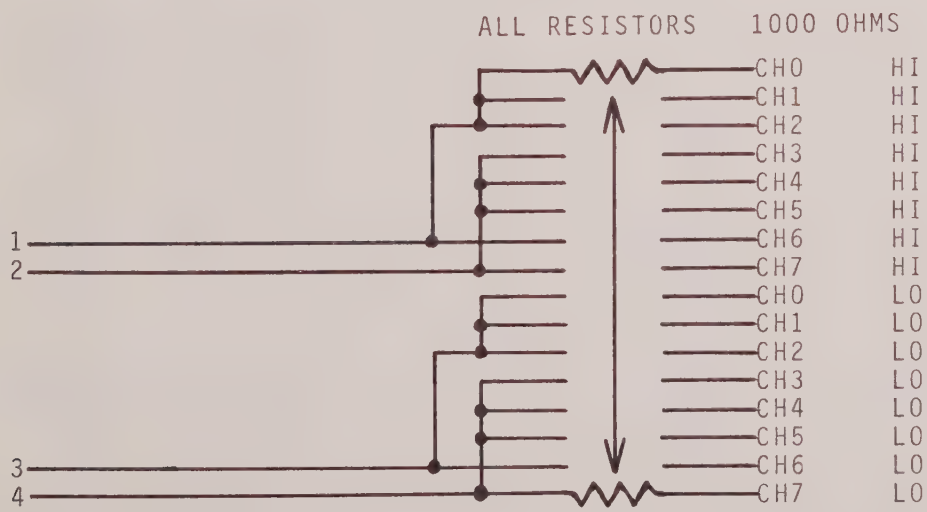
FIGURE 90027



Lo inputs tied to analog gnd. If more channels are present than 8 this same pattern is repeated.

DIFFERENTIAL INPUTS

FIGURE 90028



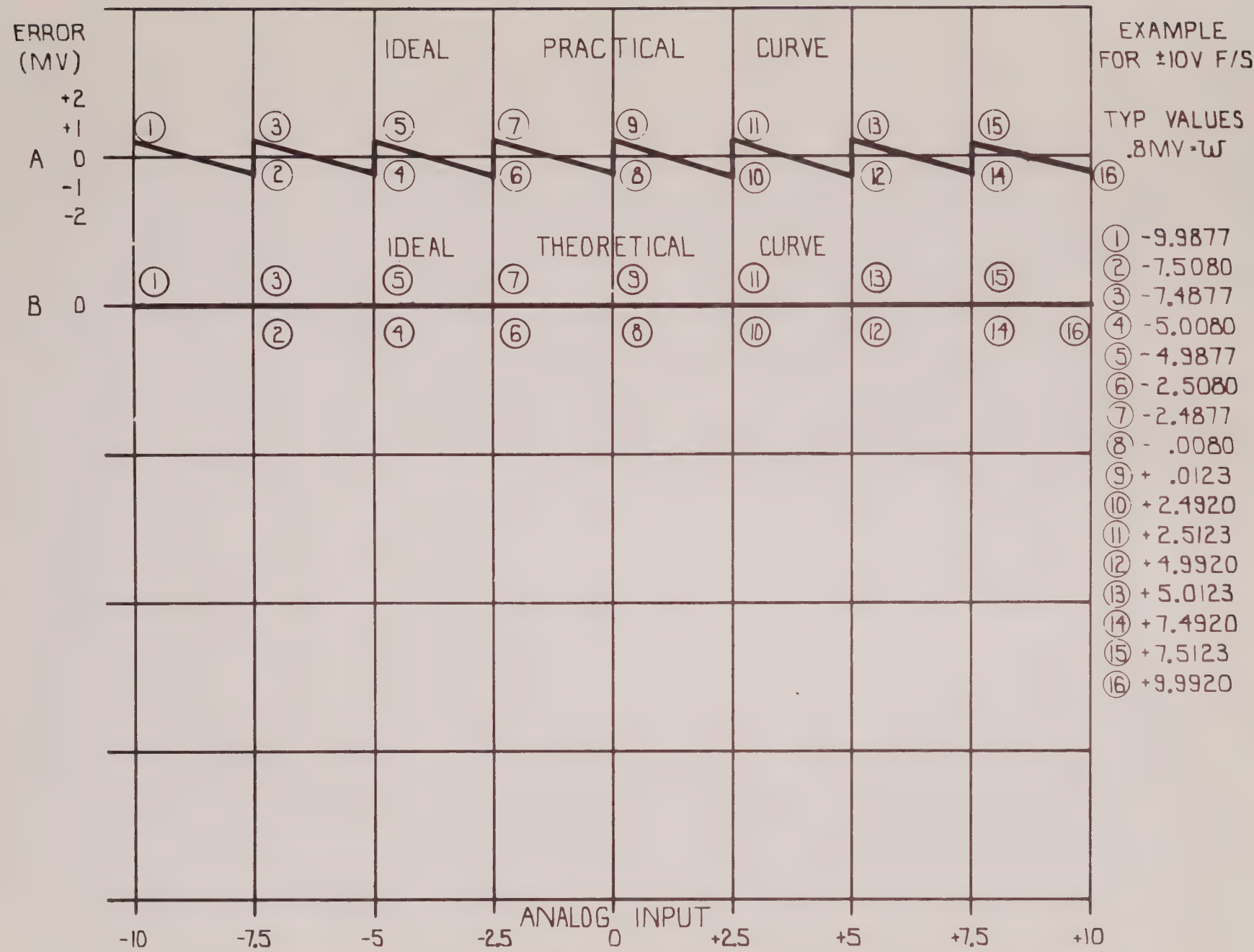
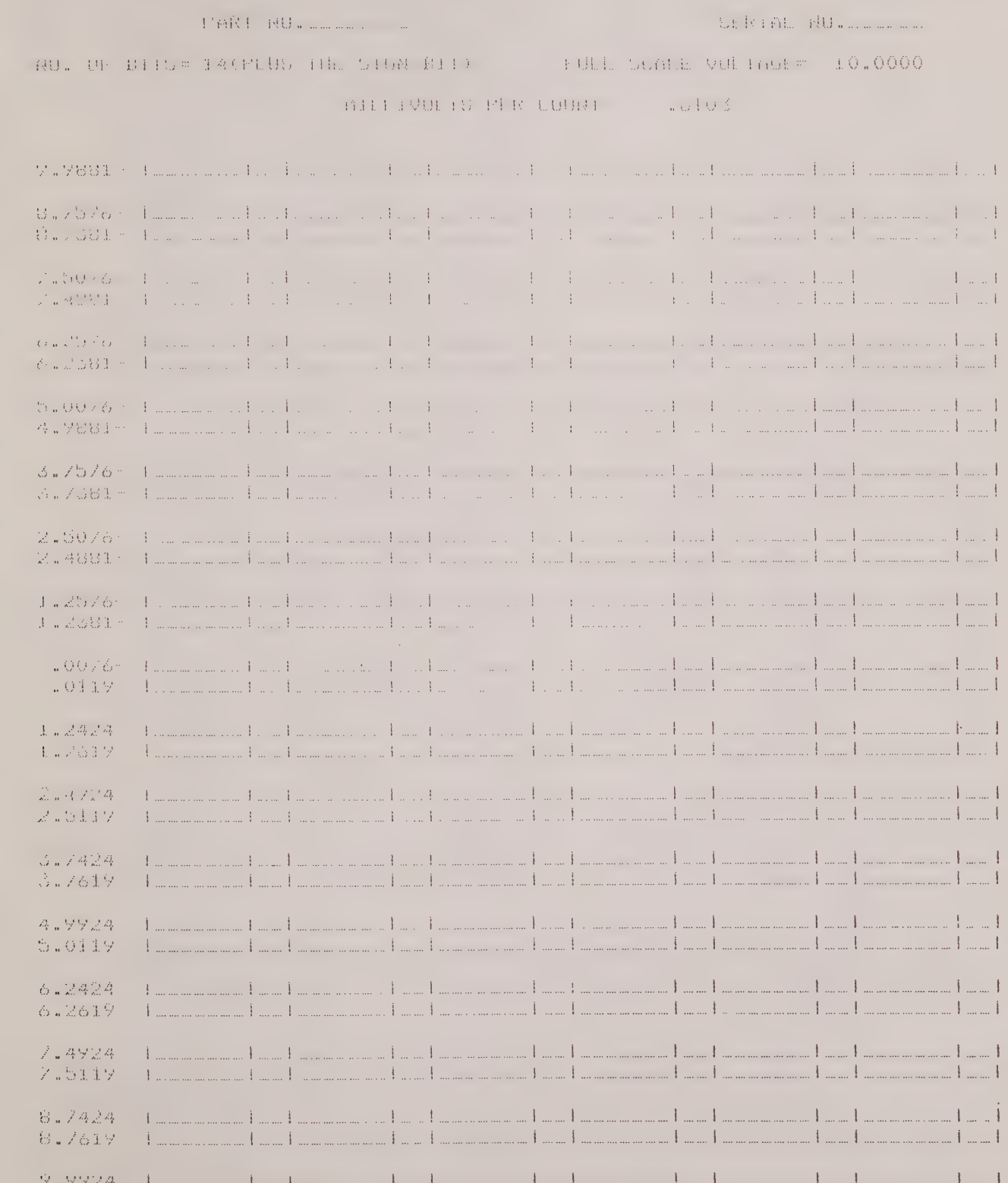


FIGURE 90029

FIGURE 90030



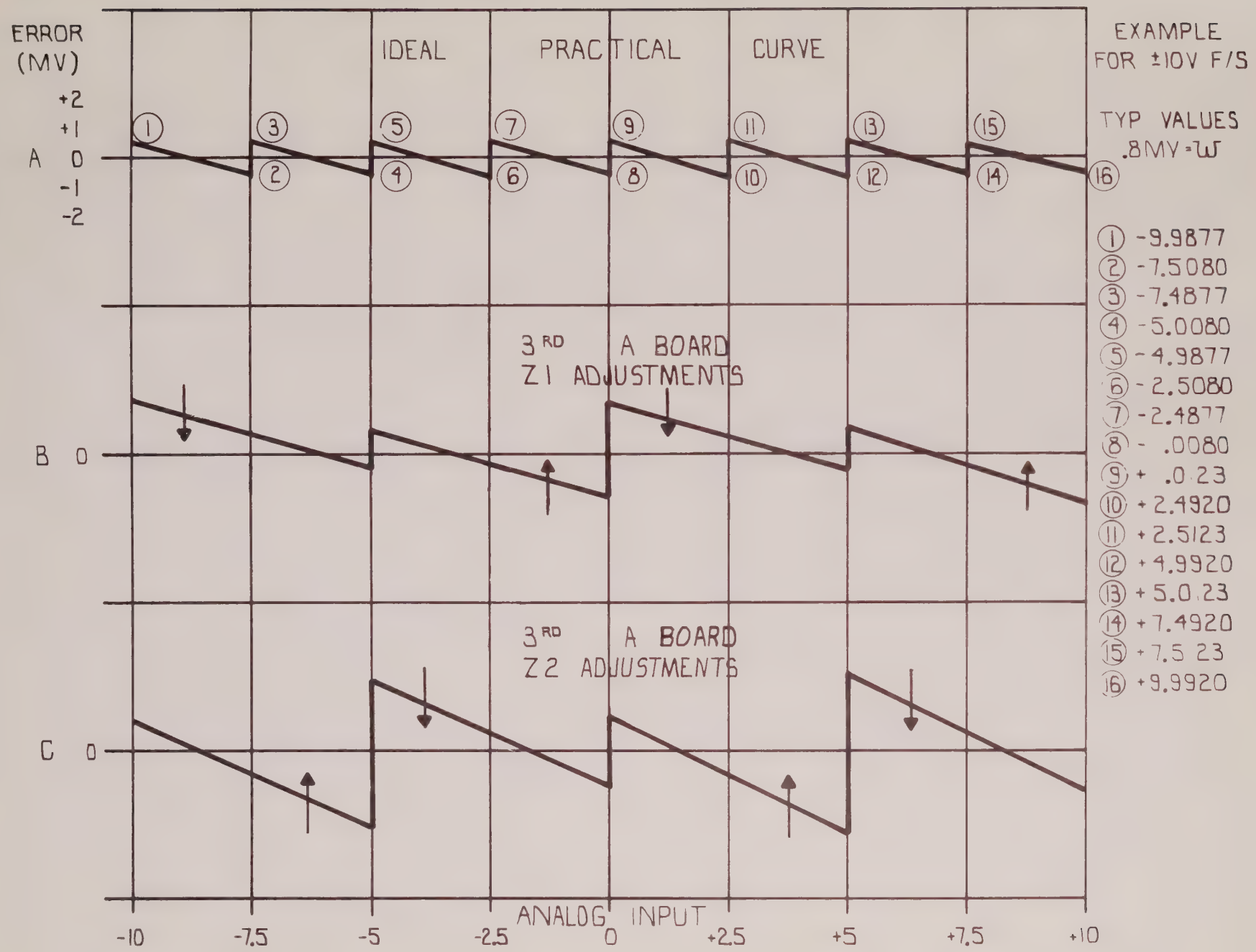


FIGURE 90031

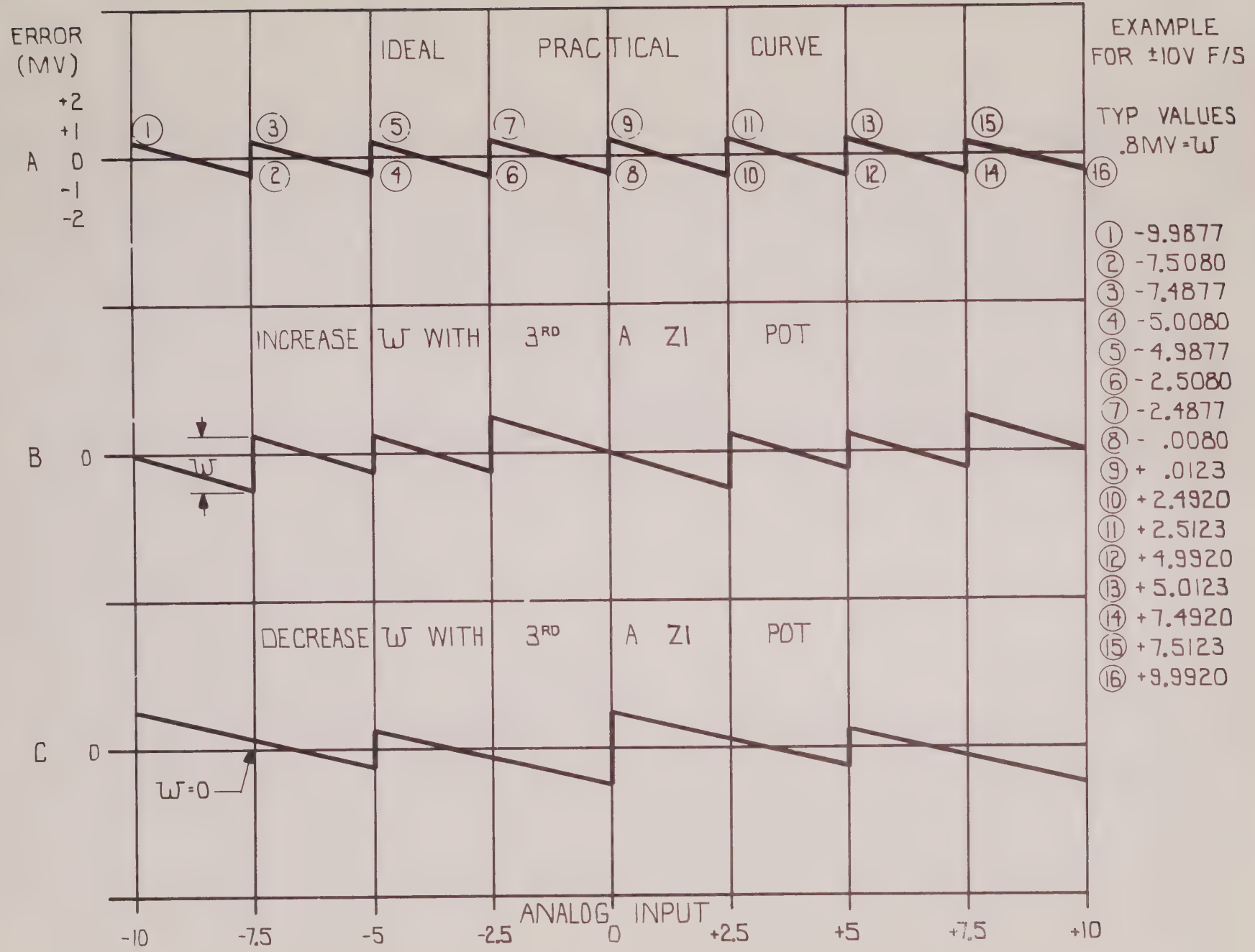


FIGURE 90032

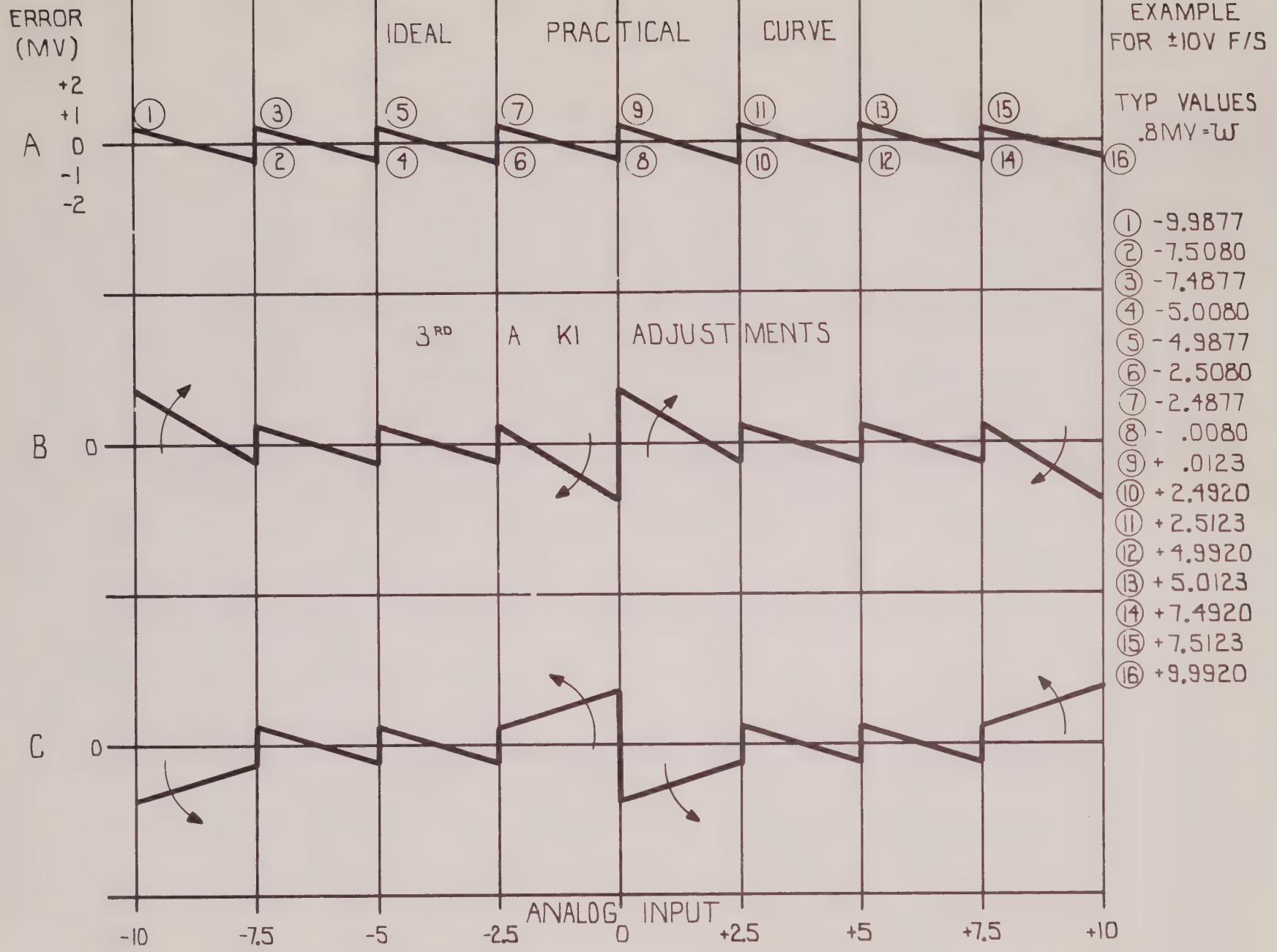


FIGURE 90033

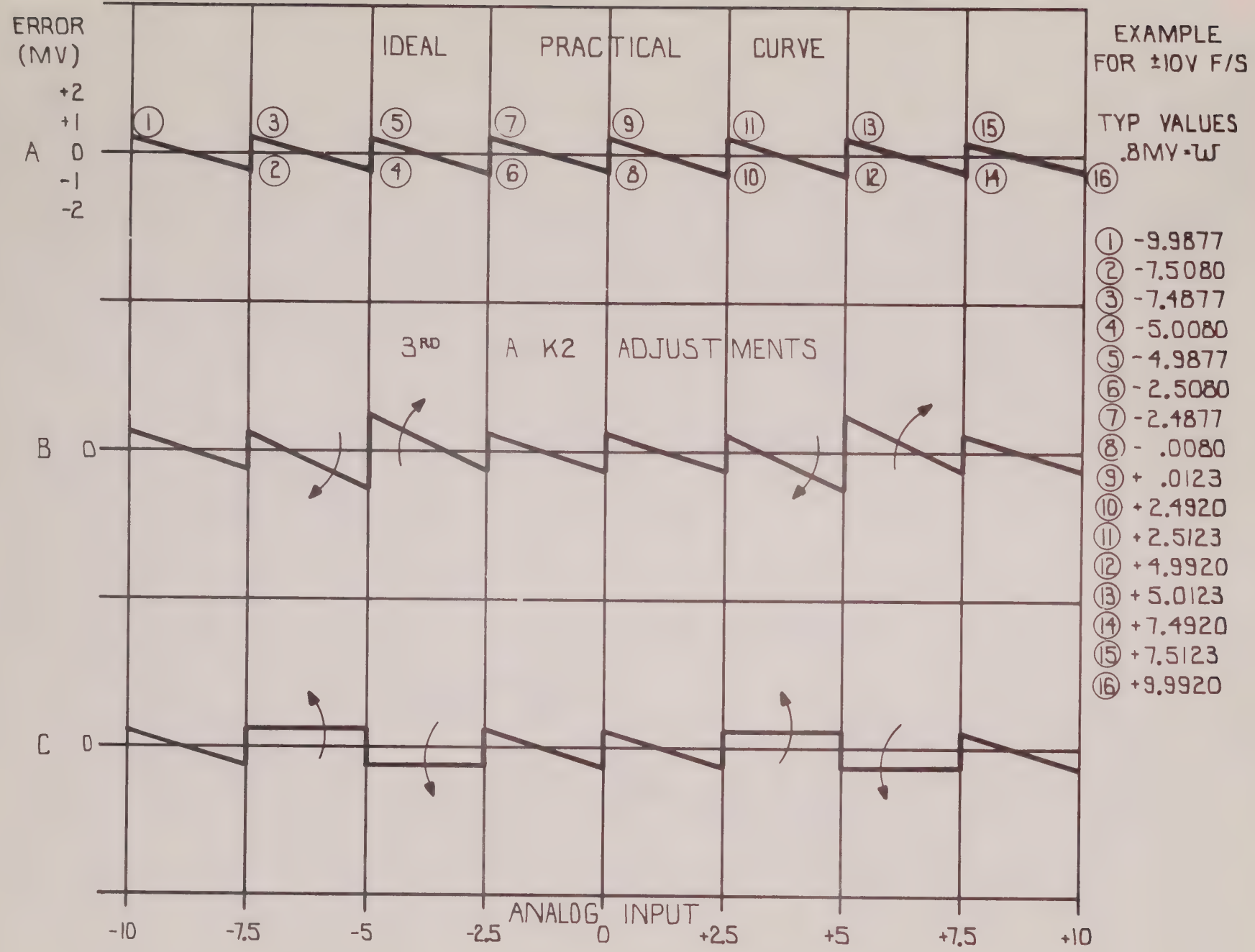


FIGURE 90034

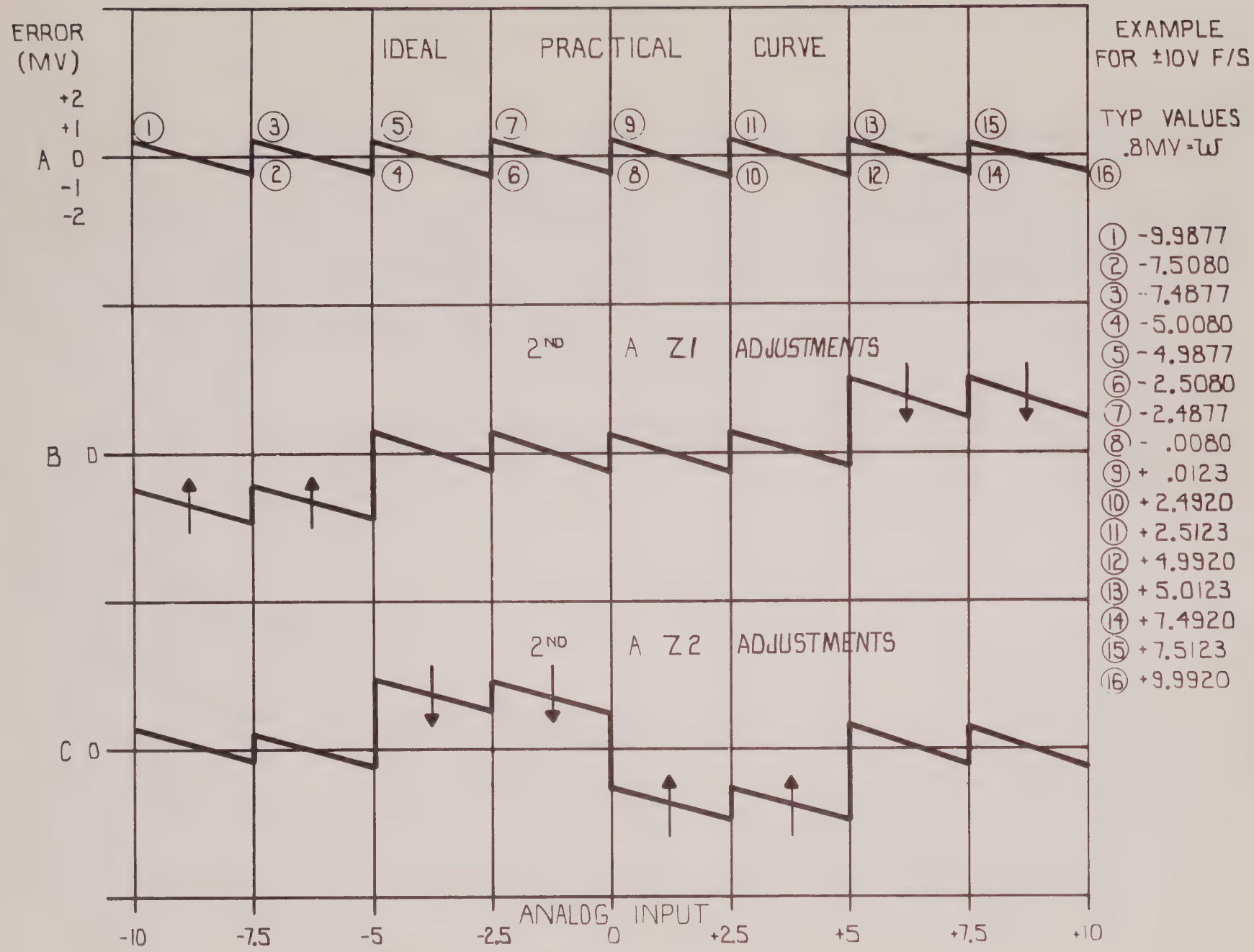


FIGURE 90035

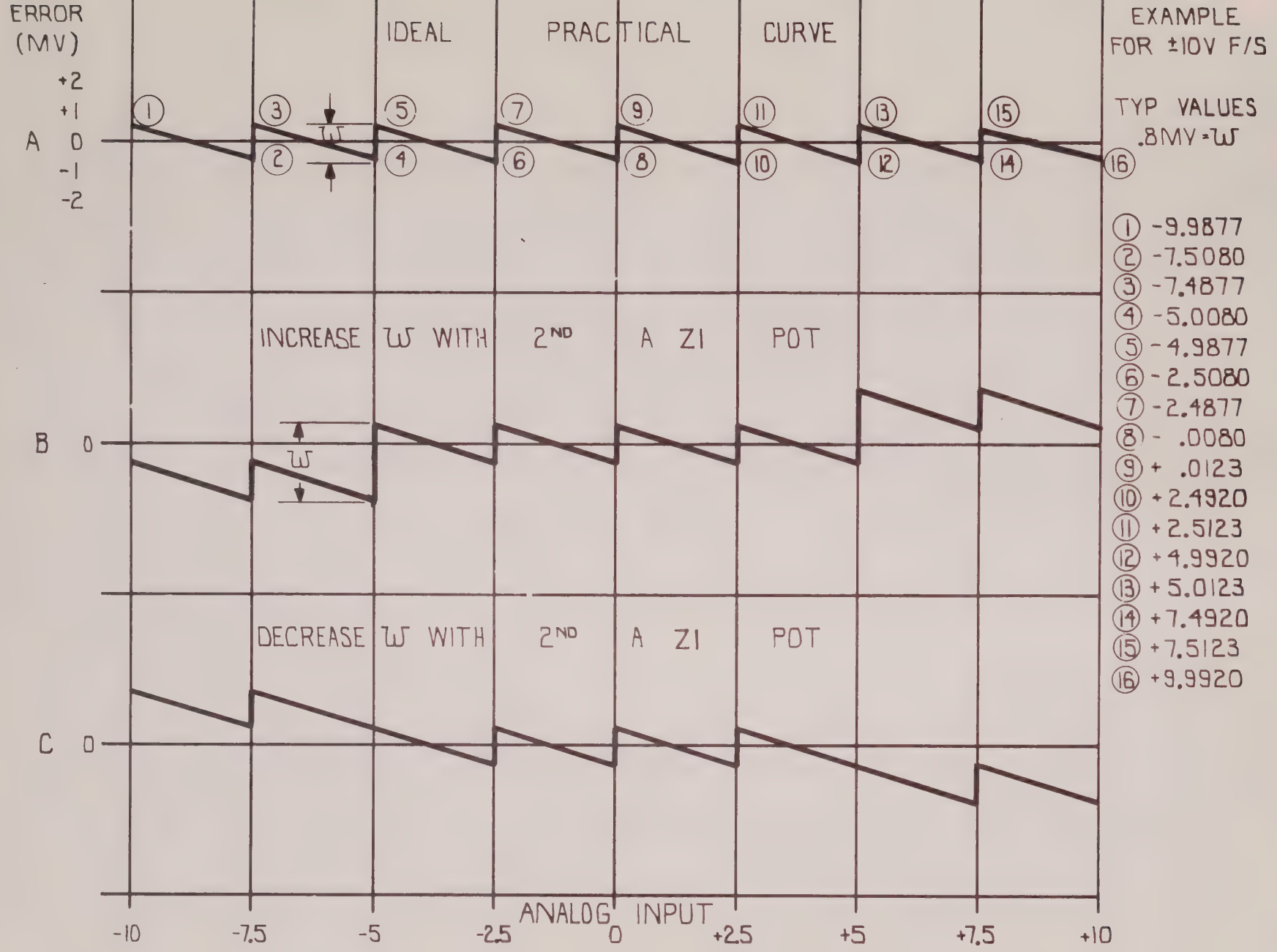


FIGURE 90036

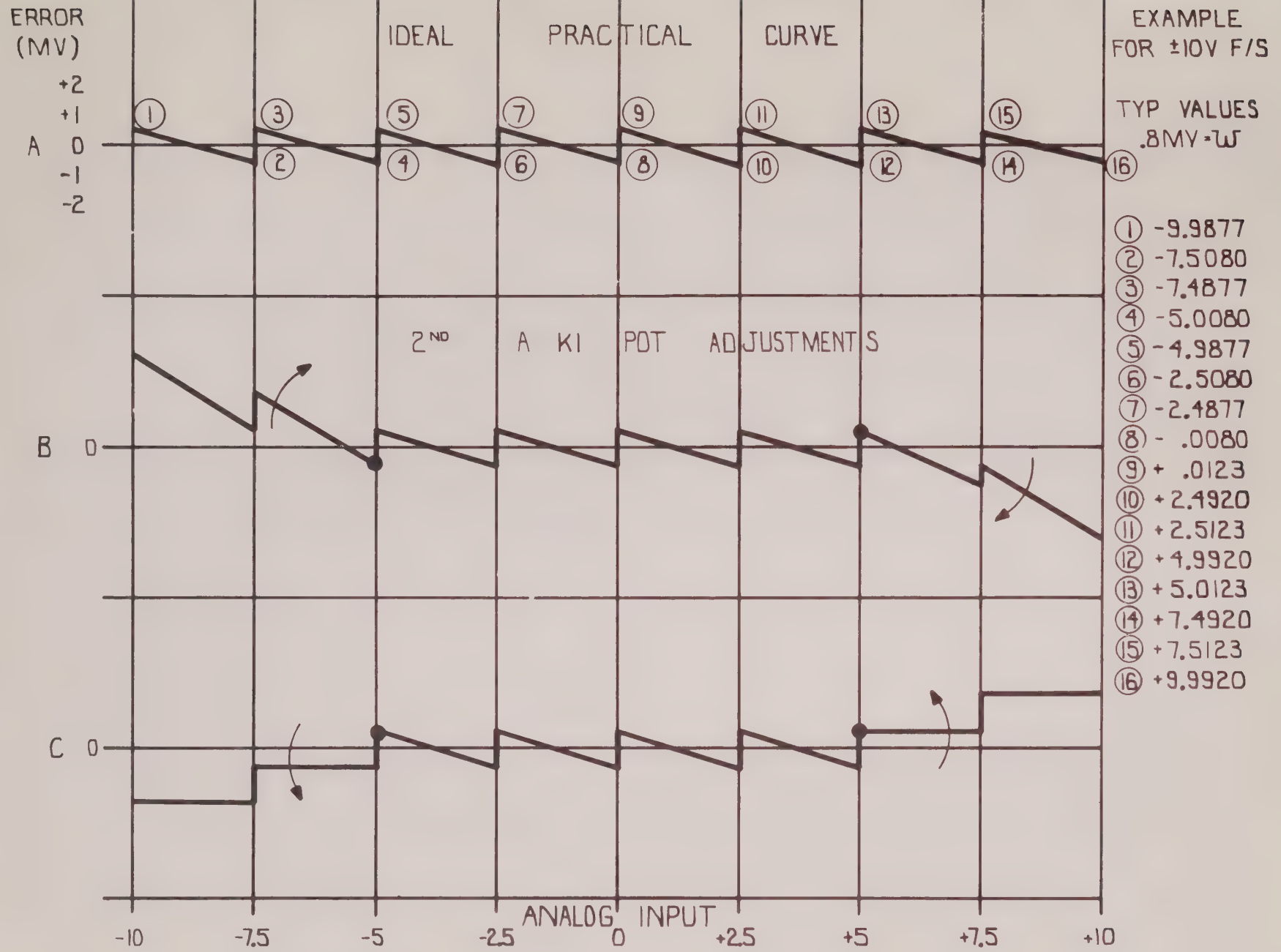


FIGURE 90037

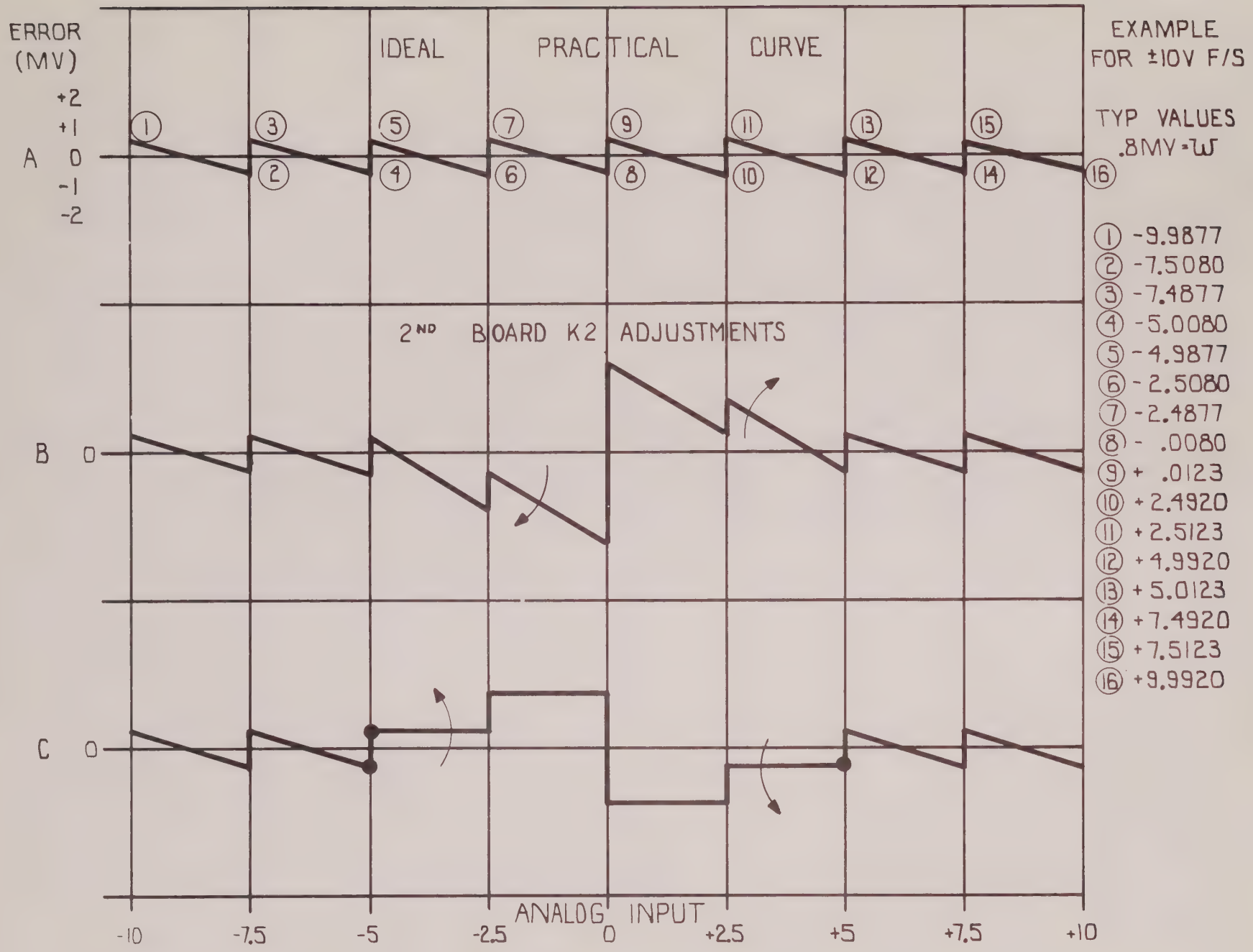


FIGURE 90038

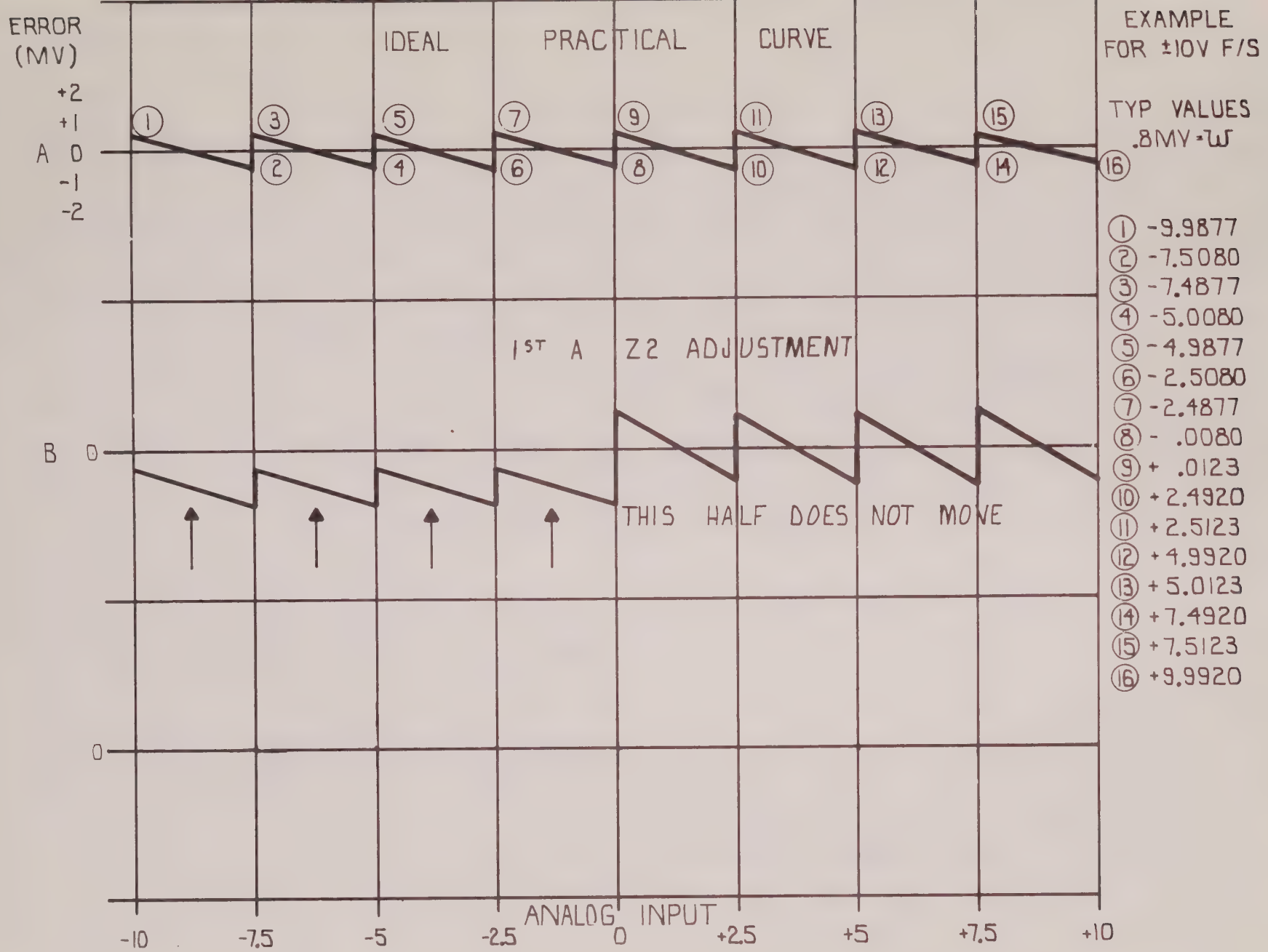


FIGURE 90039

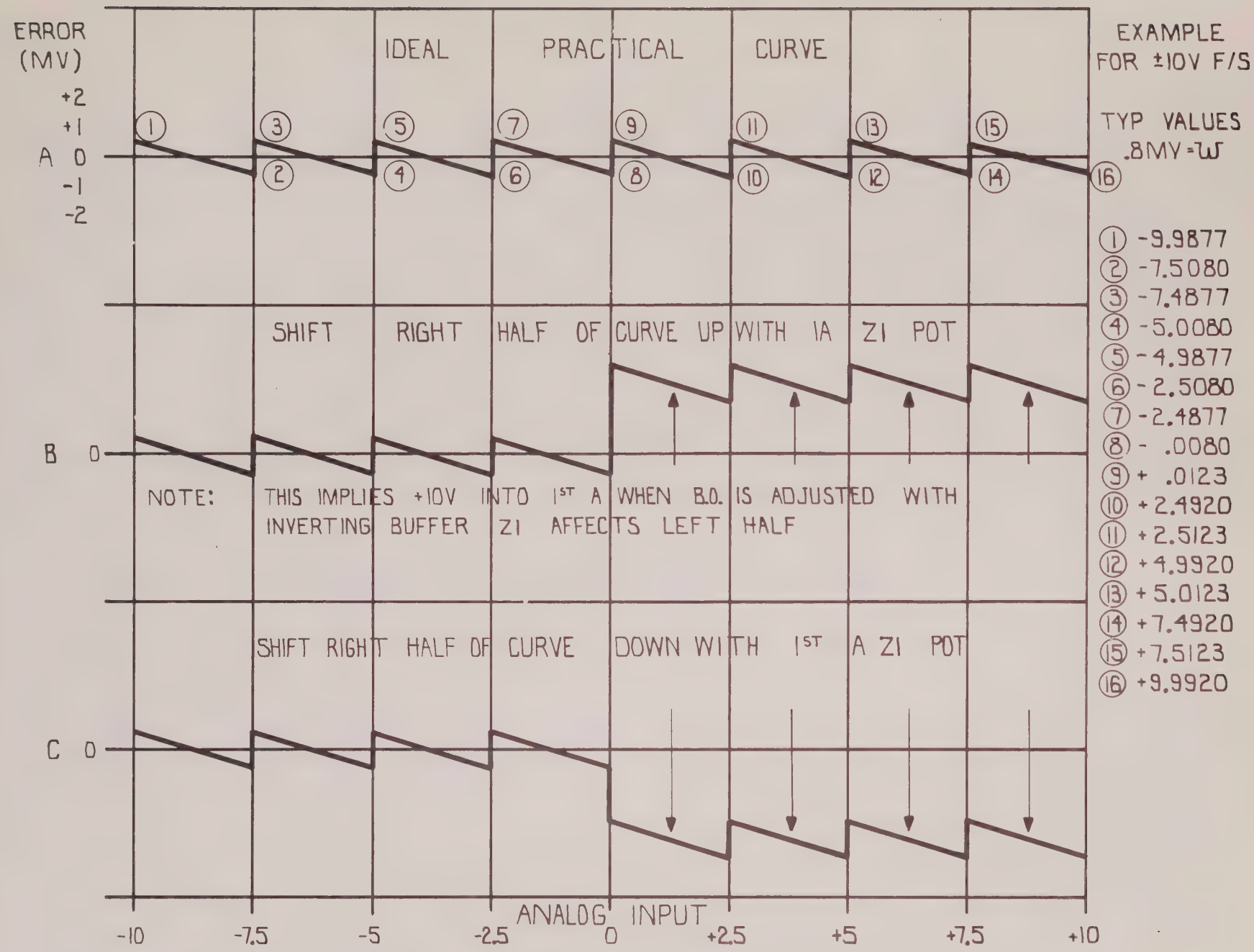


FIGURE 90040

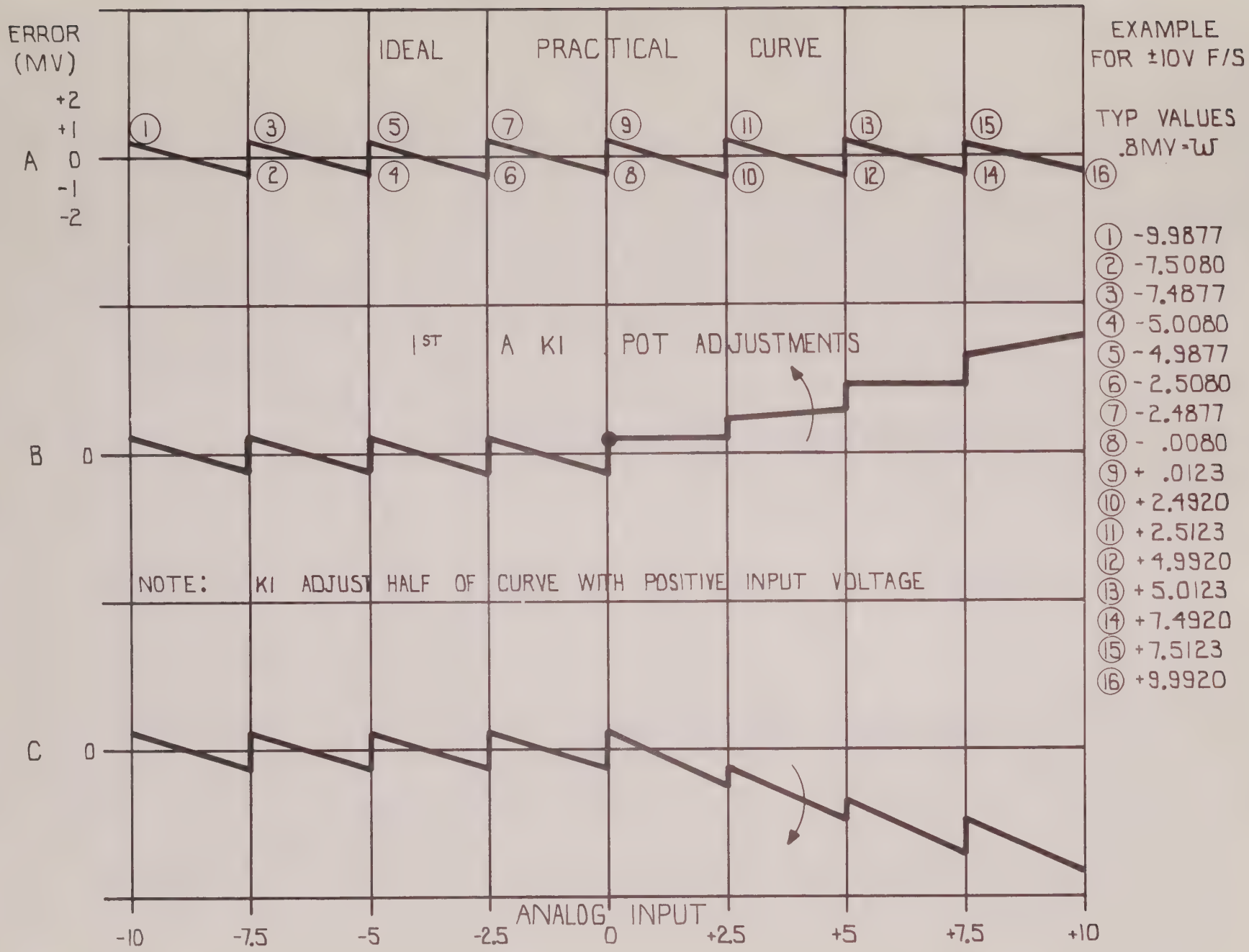


FIGURE 90041

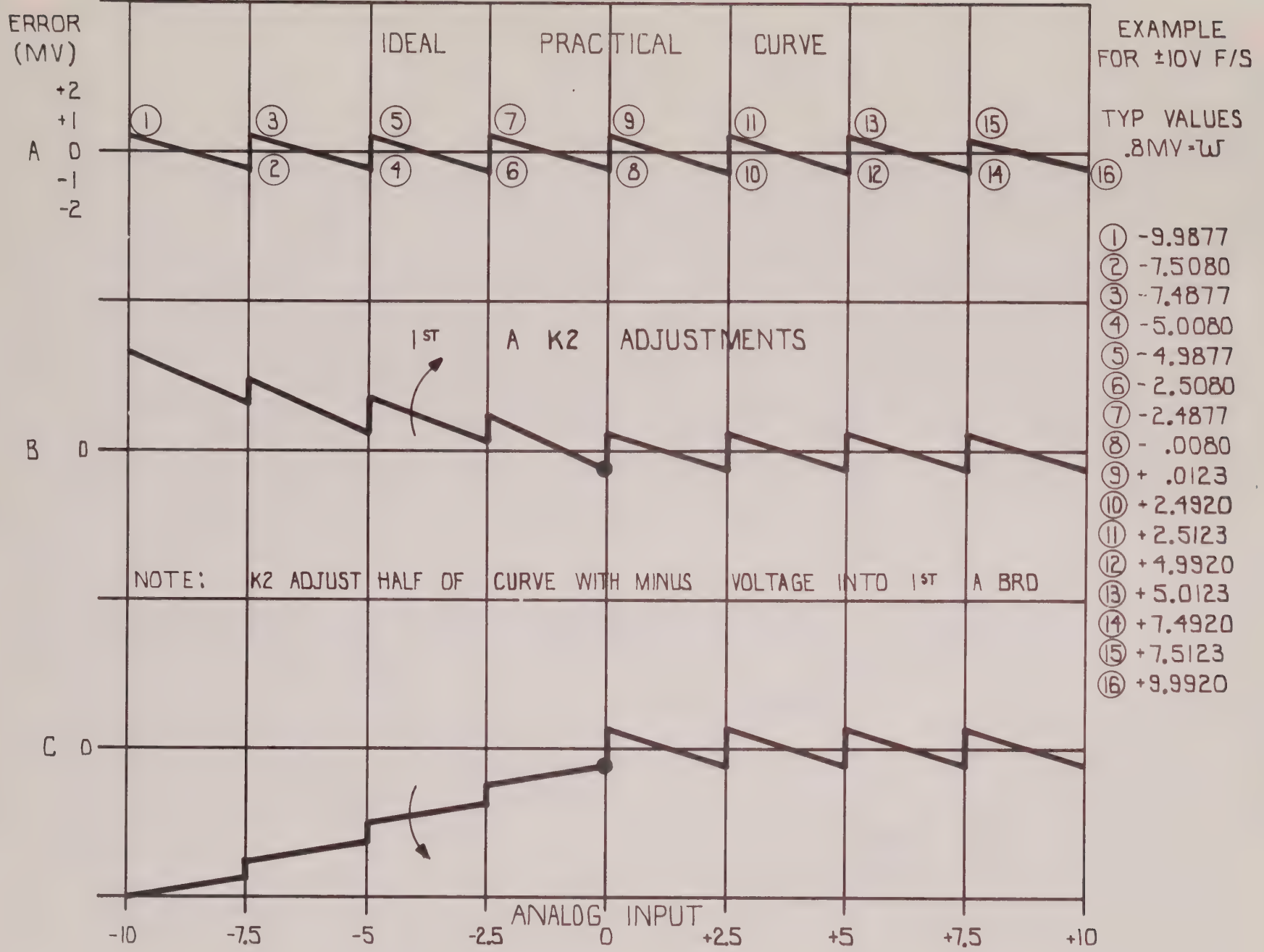


FIGURE 90042

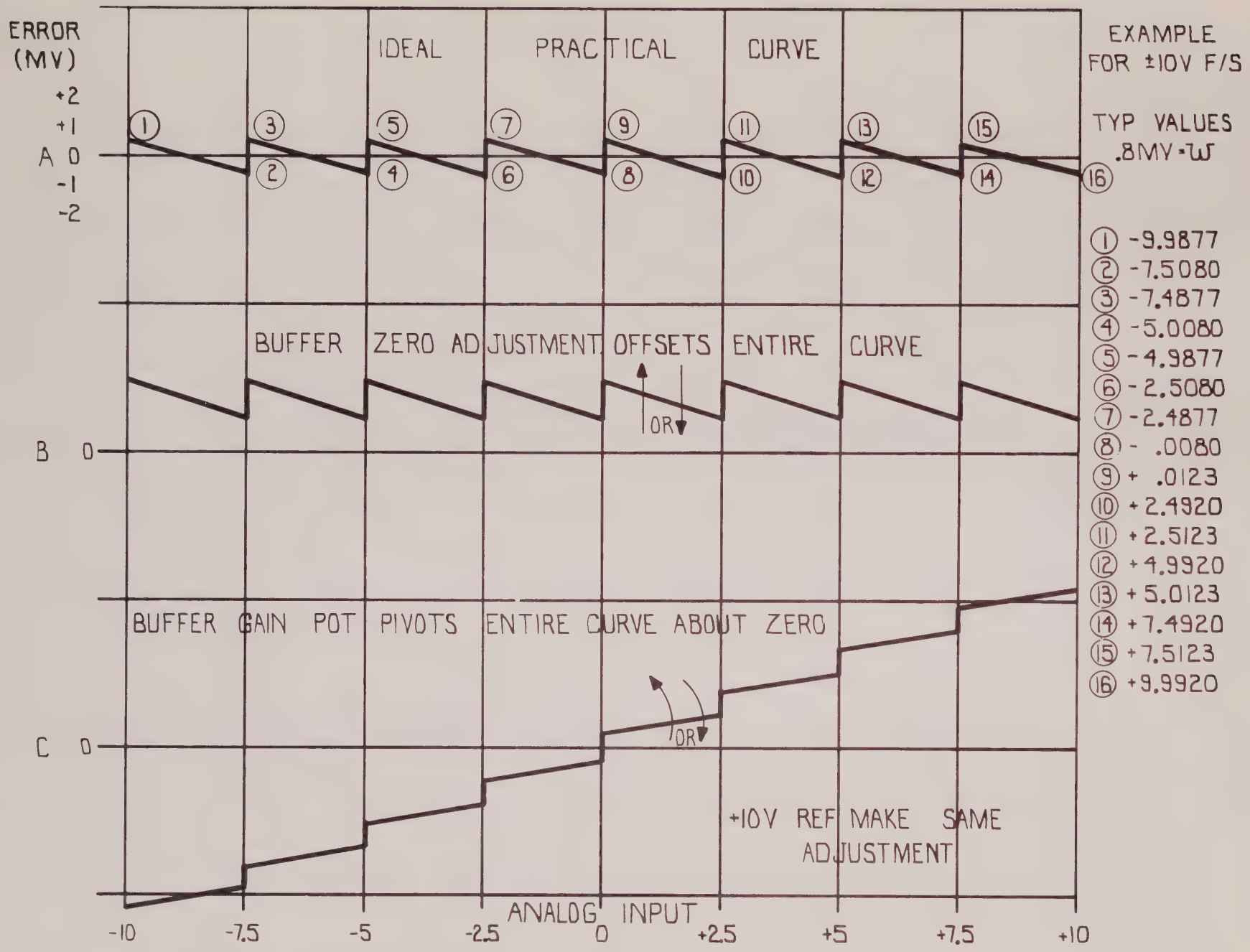


FIGURE 90043

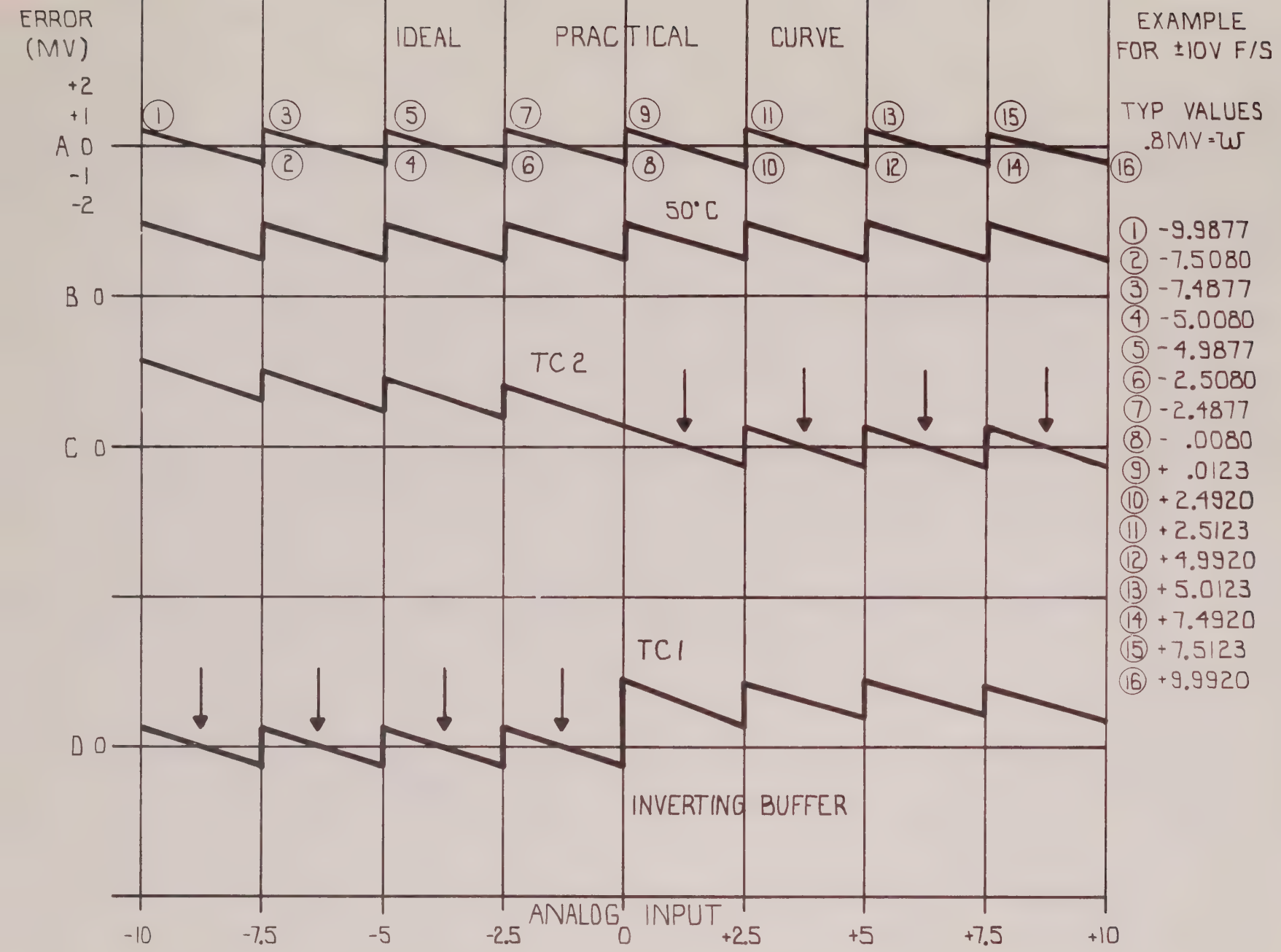


FIGURE 90044

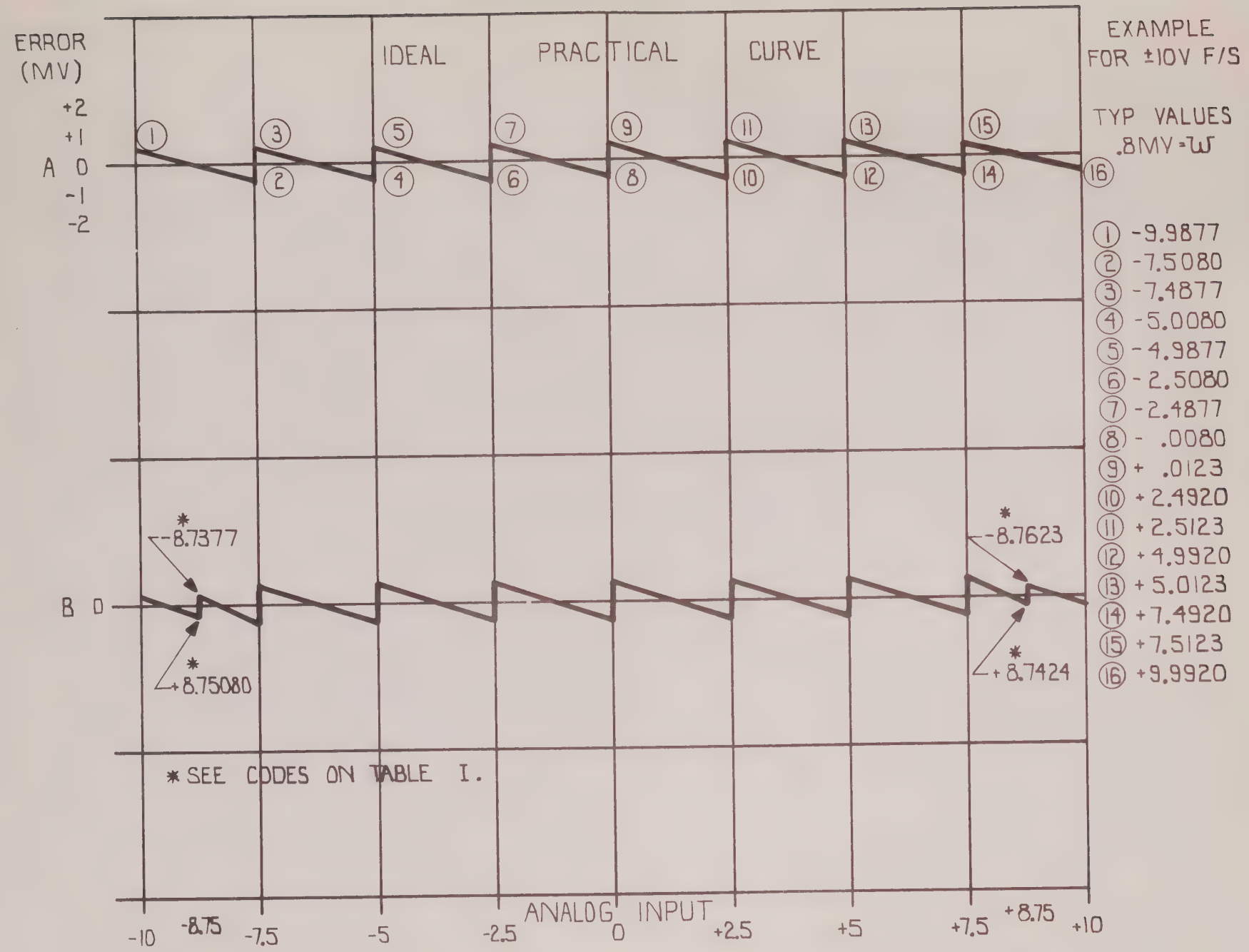


FIGURE 90045

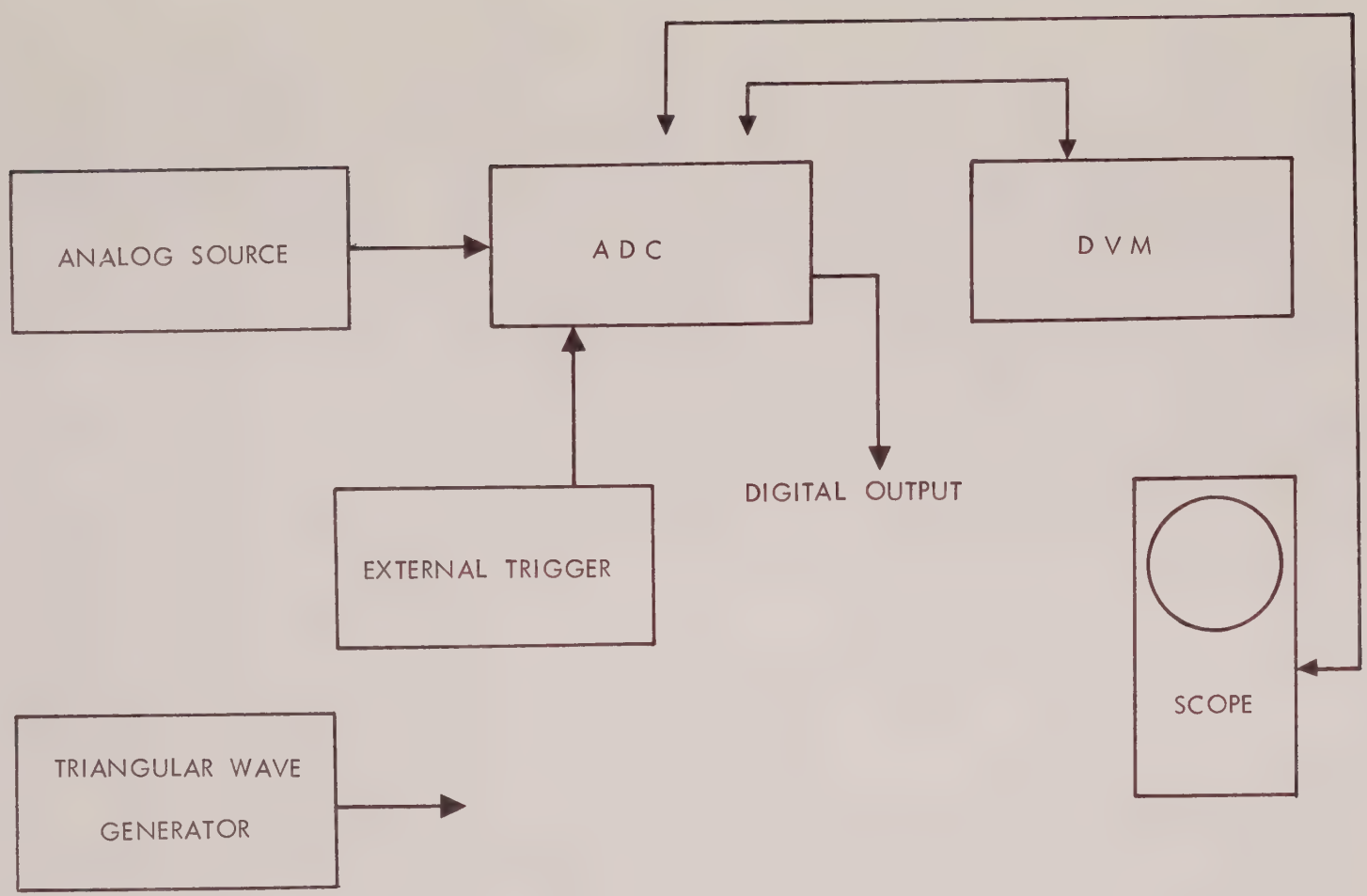


FIGURE 90046

BENCH TEST SETUP

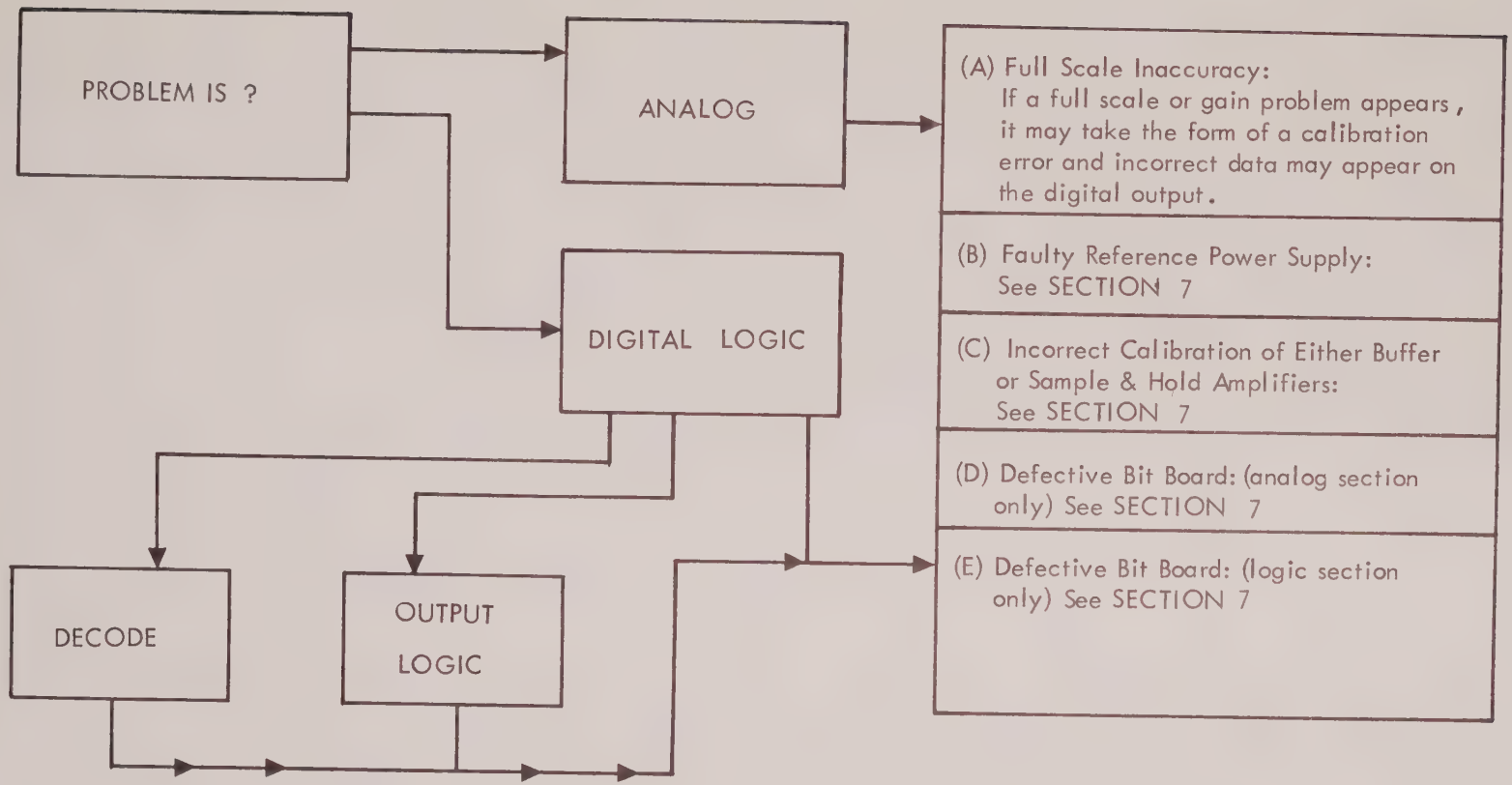


FIGURE 90047

TROUBLESHOOTING FLOW BLOCK DIAGRAM

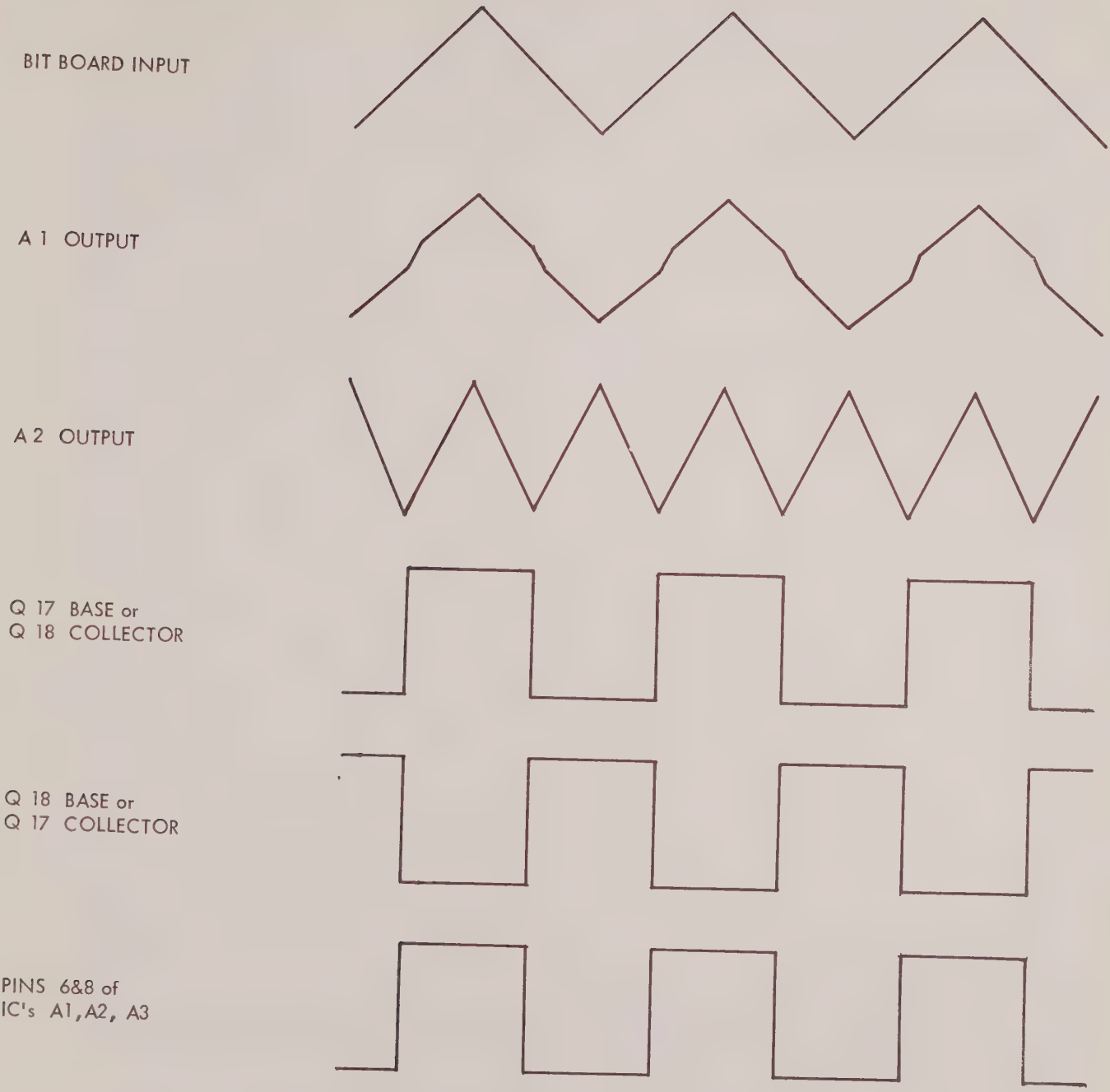


FIGURE 90048

BIT BOARD TYPICAL WAVEFORMS

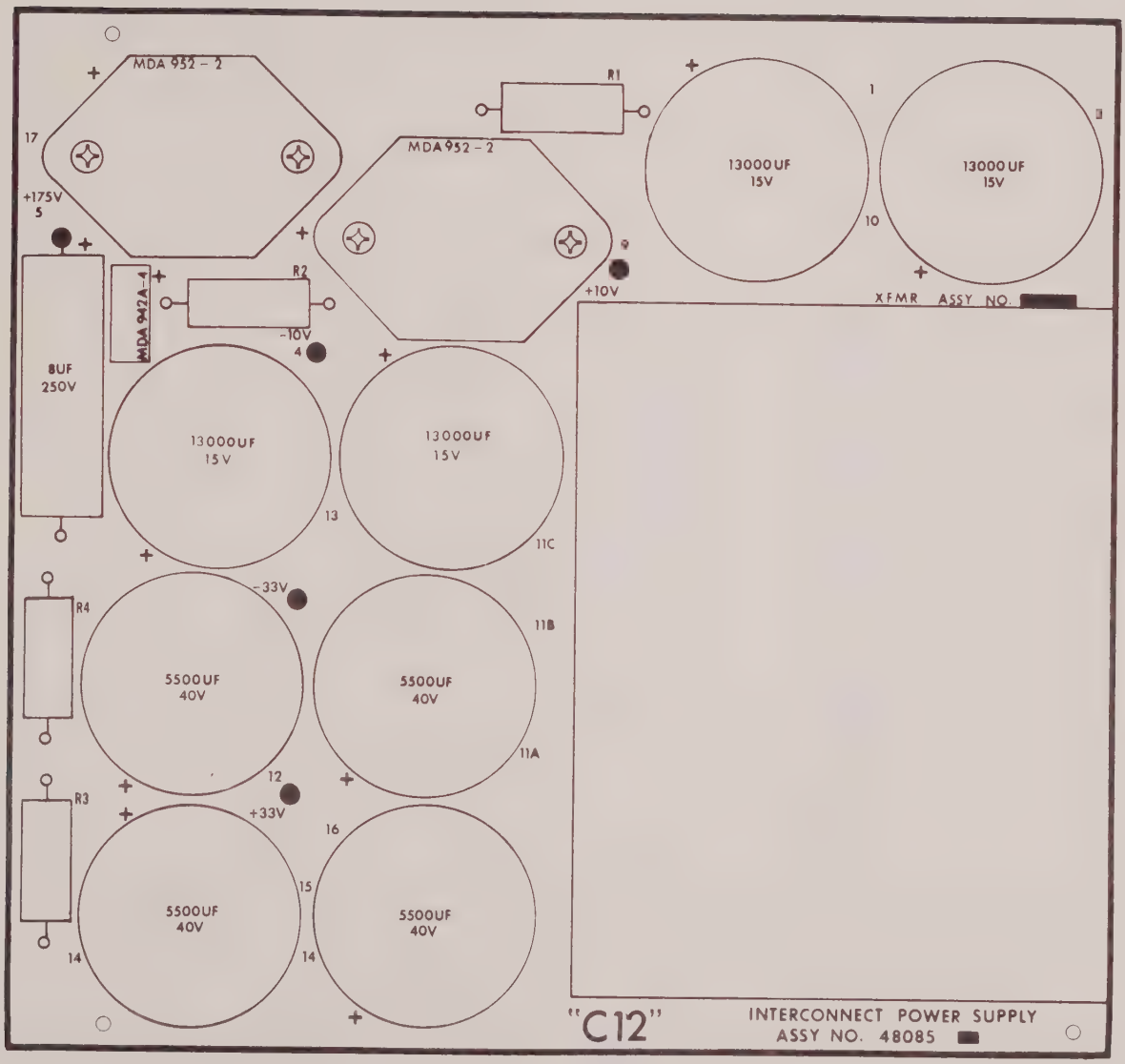
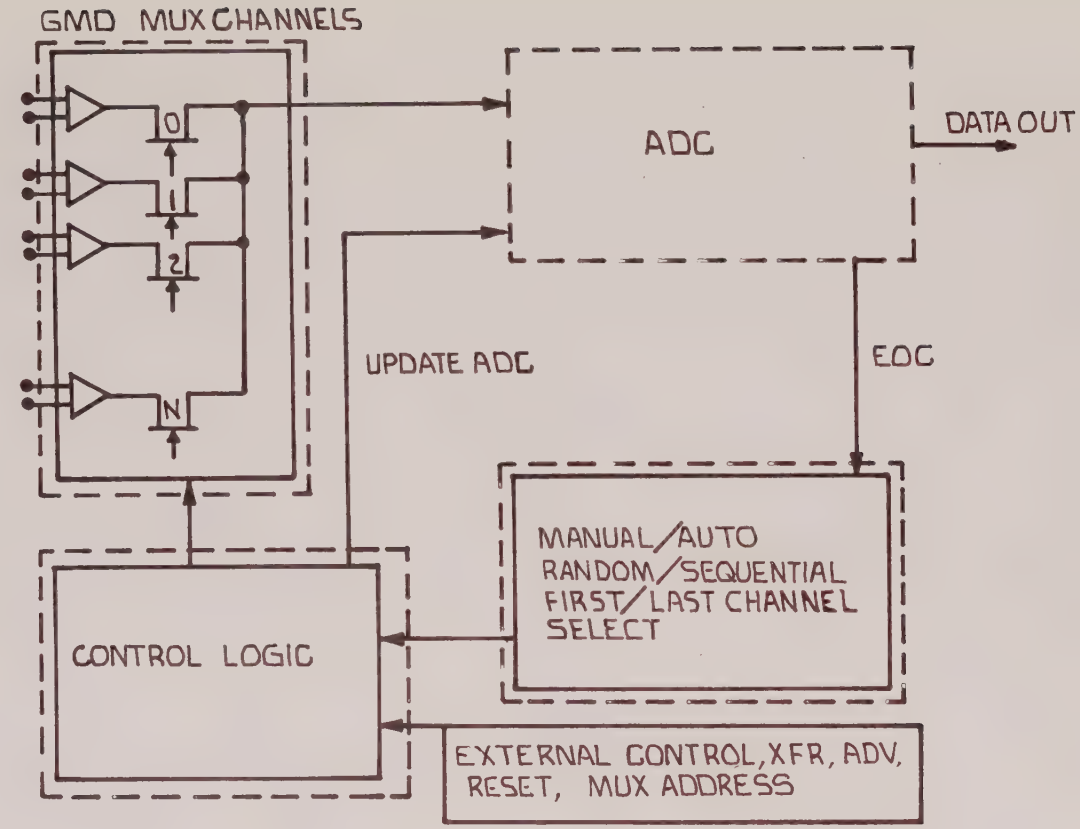


FIGURE 90049

(POWER SUPPLY TEST POINT)



DOTTED LINES INDICATE THE MULTIPLEXER AND ITS CONTROLS MAY BE MOUNTED IN THE SAME MODULE AS THE ADC OR MOUNTED IN A SEPARATE MODULE DEPENDING UPON CUSTOMER REQUIREMENTS

FIGURE 90080
MULTIPLEXER MODULE
BLOCK DIAGRAM

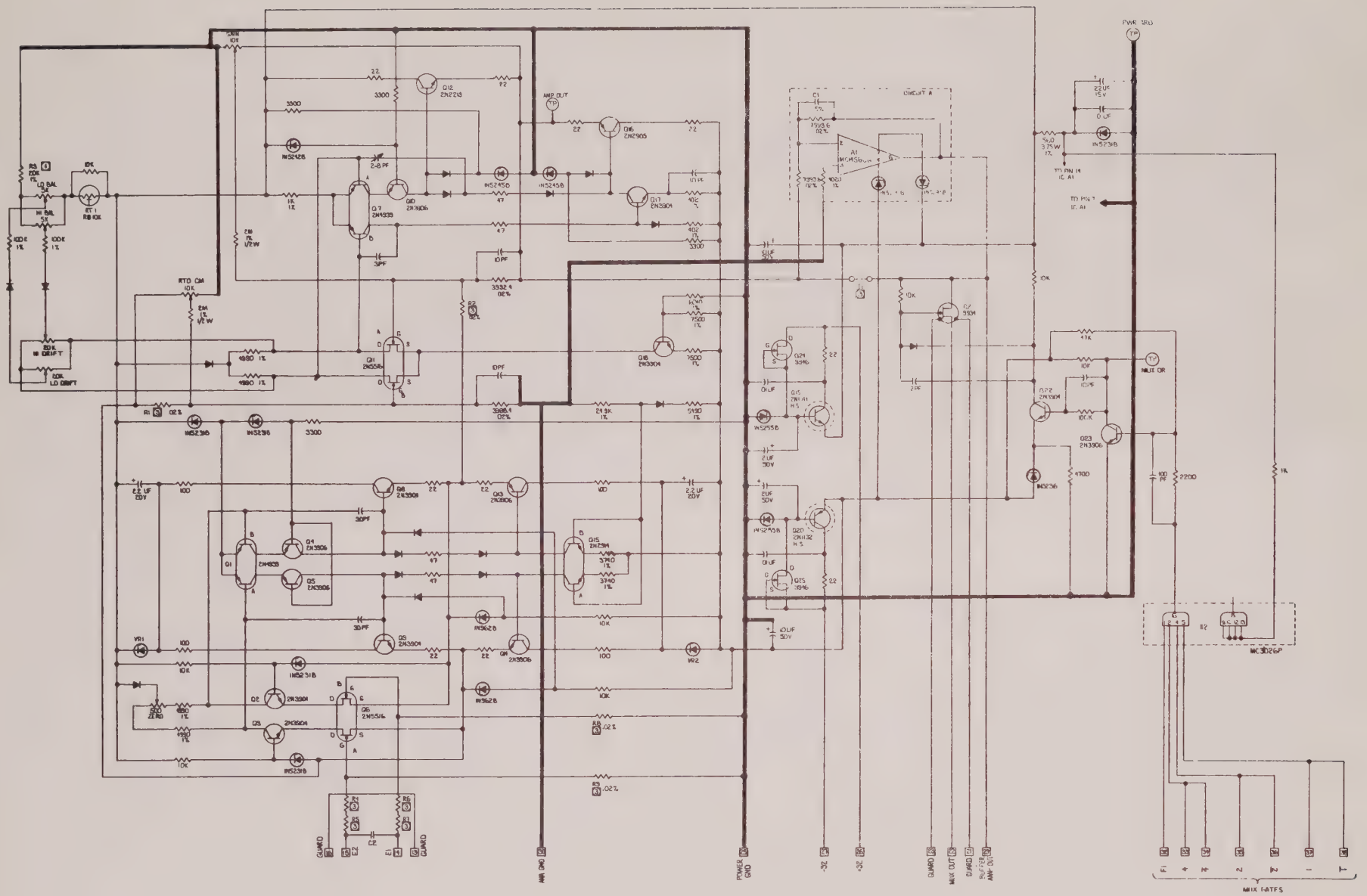


FIGURE 90081

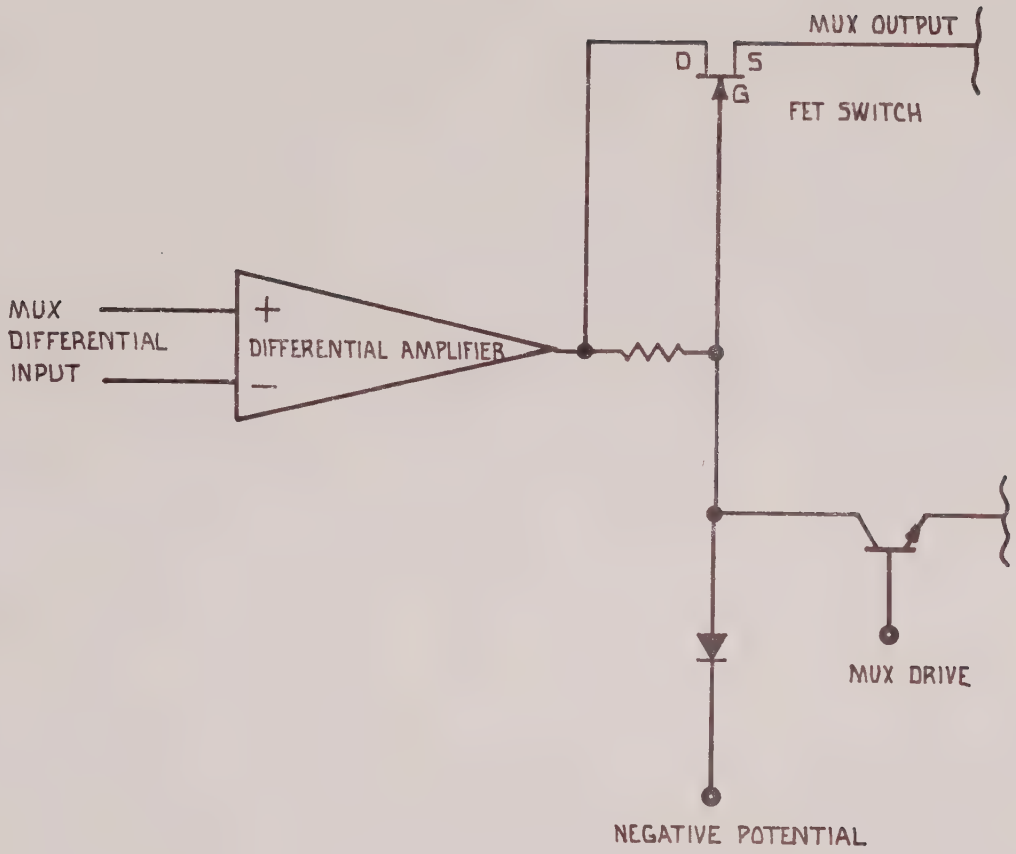


FIGURE 90082

MULTIPLEXER SWITCH BLOCK DIAGRAM

****

FIGURE 90083

THIS FIGURE IS NORMALLY A GENERAL PURPOSE
SHEMATIC OF A COMMON VERSION OF THE
MODEL GMD-10/1000 AMPLIFIER/MULTIPLEXER.

BECAUSE SMALL CHANGES MAY TAKE PLACE IN THE
SCHEMATIC OF THE AMPLIFIER, WE REFER YOU
TO THE DRAWING IN SECTION (11) OF THIS MANUAL
WHICH CONTAINS THE SCHEMATIC DRAWING
THAT DESCRIBES THE PARTICULAR AMPLIFIER IN
YOUR SYSTEM.

****

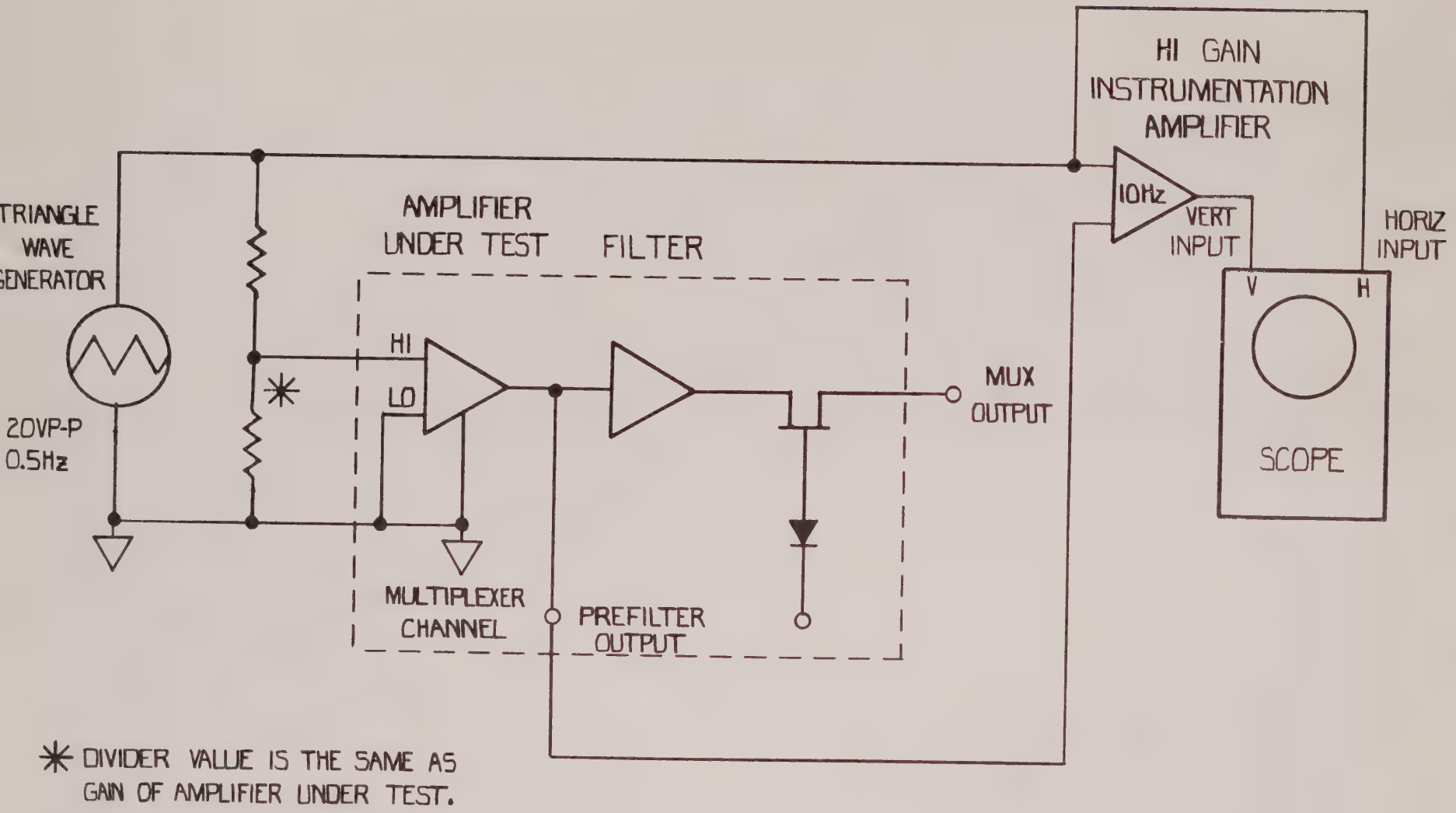


FIGURE 90084

GAIN ADJUSTMENT SET-UP

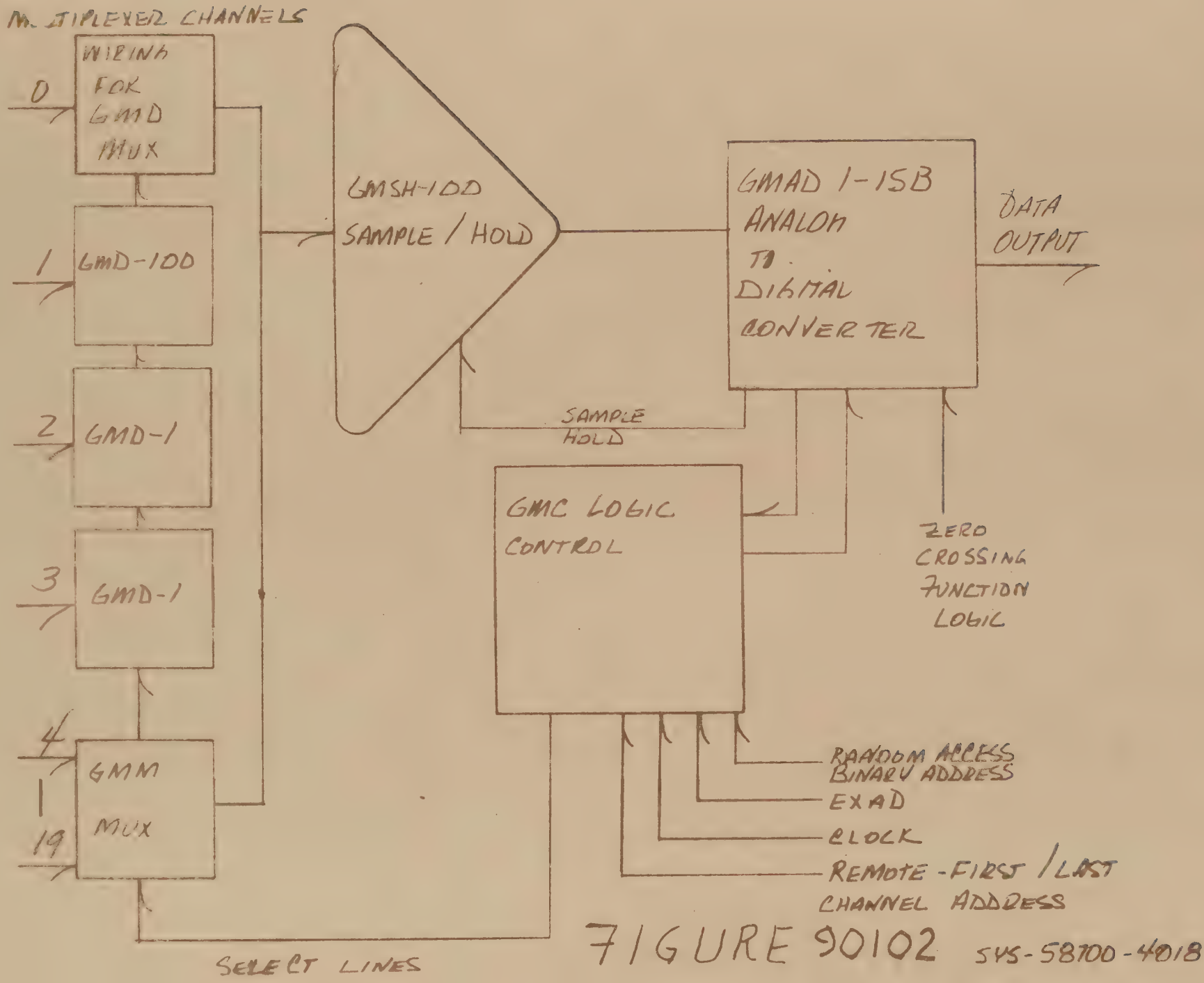
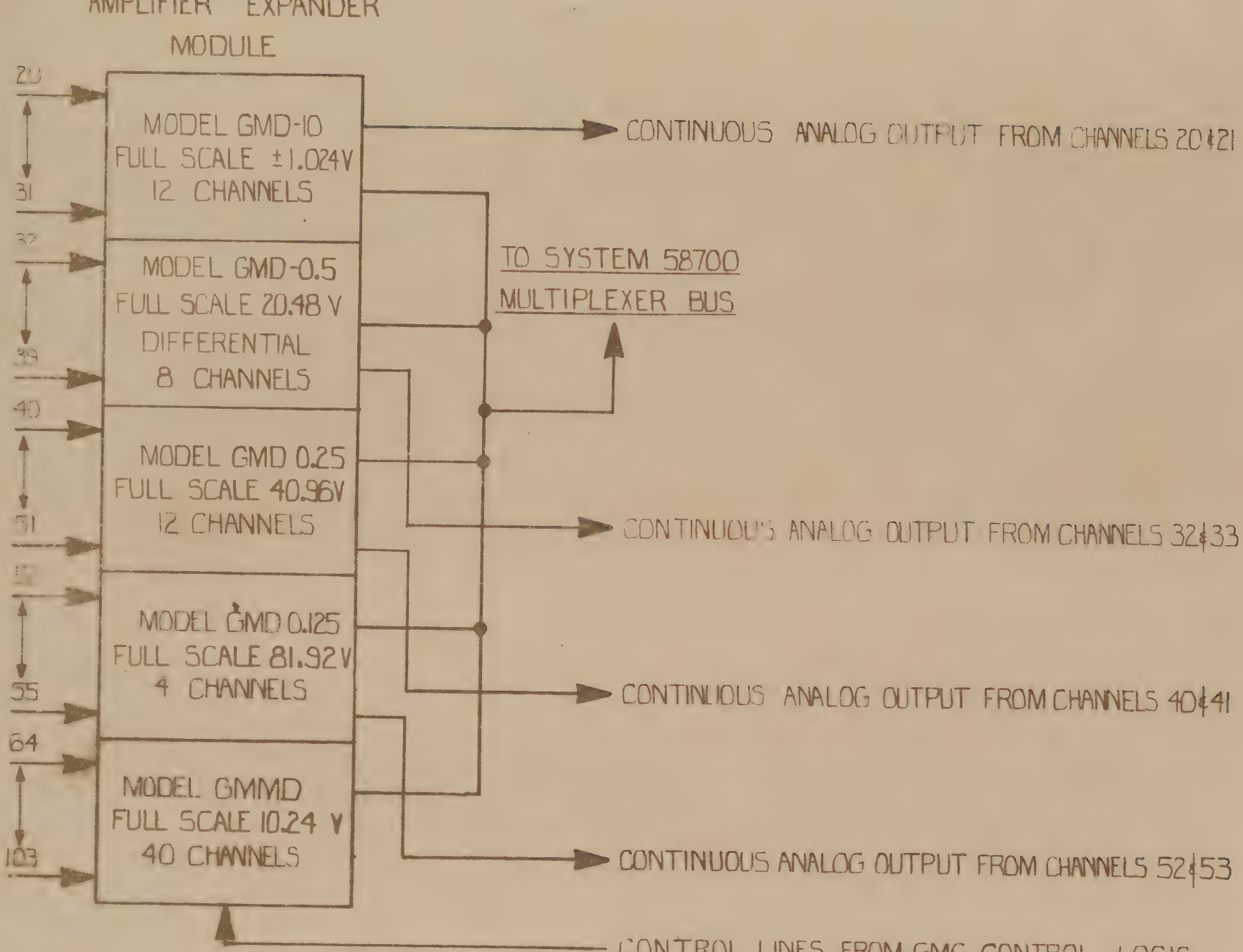


FIGURE 90102 SYS-58100-4018



* 56-63 NOT USED

FIGURE 90103

SYS-58700-58845-4106

SECTION 9

TABLES

FRONT PANEL INDICATORS

(14 Bit & Sign) Two's Complement

ADC

FIGURE 90050

Sign	8192	4096	2048	1024	512	256	128	64	32	16	8	4	2	1		THEORETICAL ANALOG INPUT (% f/s)		CORRESPONDING DC VOLTAGE (Volts) +10v f/s	
-	0	0	0	0	0	0	0	0	0	1	0				*	-f/s	+19.5 cts	-9.9881	1
-	0	0	0	1	1	1	1	1	1	1	0				*	-7/8	-12.5 "	-8.7576	
-	0	0	1	0	0	0	0	0	0	1	0				*	-7/8	+19.5 "	-8.7381	
-	0	0	1	1	1	1	1	1	1	1	0				*	-3/4	-12.5 "	-7.5076	2
-	0	1	0	0	0	0	0	0	0	1	0				*	-3/4	+19.5 "	-7.4881	3
-	0	1	0	1	1	1	1	1	1	1	0				*	-5/8	-12.5 "	-6.2576	
-	0	1	1	0	0	0	0	0	0	1	0				*	-5/8	+19.5 "	-6.2381	
-	0	1	1	1	1	1	1	1	1	1	0				*	-1/2	-12.5 "	-5.0076	4
-	1	0	0	0	0	0	0	0	0	1	0				*	-1/2	+19.5 "	-4.9881	5
-	1	-	-	1	1	1	1	1	1	1	0				*	-3/8	-12.5 "	-3.7576	
-	1	0	1	0	0	0	0	0	0	1	0				*	-3/8	+19.5 "	-3.7381	
-	1	0	1	1	1	1	1	1	1	1	0				*	-1/4	-12.5 "	-2.5076	6
-	1	1	0	0	0	0	0	0	0	1	0				*	-1/4	+19.5 "	-2.4881	7
-	1	1	0	1	1	1	1	1	1	1	0				*	-1/8	-12.5 "	-1.2576	
-	1	1	1	0	0	0	0	0	0	1	0				*	-1/8	+19.5 "	-1.2381	
-	1	1	1	1	1	1	1	1	1	1	0				*	0	-12.5 "	- .0076	8
+	1	0	0	0	0	0	0	0	0	1	0				*	0	+19.5 "	+ .0119	9
+	0	0	0	1	1	1	1	1	1	1	0				*	+1/8	-12.5 "	+1.2424	
+	0	0	1	0	0	0	0	0	0	1	0				*	+1/8	-19.5 "	+1.2519	
+	0	0	1	1	1	1	1	1	1	1	0				*	+1/4	-12.5 "	+2.4924	10
+	0	1	0	0	0	0	0	0	0	1	0				*	+1/4	+19.5 "	+2.5119	11
+	0	1	0	1	1	1	1	1	1	1	0				*	+3/8	-12.5 "	+3.7424	
+	0	1	1	0	0	0	0	0	0	1	0				*	+3/8	+19.5 "	+3.7519	
+	0	1	1	1	1	1	1	1	1	1	0				*	+1/2	-12.5 "	+4.9924	12
+	1	0	0	0	0	0	0	0	0	1	0				*	+1/2	+19.5 "	+5.0119	13
+	1	0	0	1	1	1	1	1	1	1	0				*	+5/8	-12.5 "	+6.2424	
+	1	0	1	0	0	0	0	0	0	1	0				*	+5/8	+19.5 "	+6.2519	
+	1	0	1	1	1	1	1	1	1	1	0				*	+3/4	-12.5 "	+7.4924	14
+	1	1	0	0	0	0	0	0	0	1	0				*	+3/4	-19.5 "	+7.5119	15
+	1	1	0	1	1	1	1	1	1	1	0				*	+7/8	-12.5 "	+8.7424	
+	1	1	1	0	0	0	0	0	0	1	0				*	+7/8	+19.5 "	+8.7519	
+	1	1	1	1	1	1	1	1	1	1	0				*	+f/s	-12.5 cts	+9.9924	16

1 Count = $\frac{f/s}{2N}$ for 10v, 14 bits = $\frac{10}{2^{14}} = \frac{10}{16,384}$ .61mv

12.5 cts = 76 mv

19.5 cts = 119 mv

$= \frac{f/s}{2^N}$

*The 3 least significant bits are used for the transition point recognition. The transition point is the point where the 3 to 4 binary change takes place. The lights will appear to be only partially ON and this should not be confused with the binary number 7 where all 3 indicators are ON full.

TABLE 90051

THE CURVE OF Figure 90029(A) WAS PLOTTED AS FOLLOWS:

POINT	ACTUAL READING	THEORETICAL INPUT	ERROR (mV)	PLOT AT	
1	-9.9877	-9.9881	+0.4	-10	-f/s
2	-7.5080	-7.5076	-0.4	-7.5	-3/4
3	-7.4877	-7.4881	+0.4	-7.5	-3/4
4	-5.0080	-5.0076	-0.4	-5	-1/2
5	-4.9877	-4.9881	+0.4	-5	-1/2
6	-2.5080	-2.5076	-0.4	-2.5	-1/4
7	-2.4877	-2.4881	+0.4	-2.5	-1/4
8	-0.0080	-0.0076	-0.4	0	0
9	+0.0123	+0.0119	+0.4	0	0
10	+2.4920	+2.4924	-0.4	+2.5	+1/4
11	+2.5123	+2.5119	+0.4	+2.5	+1/4
12	+4.9920	+4.9924	-0.4	+5	+1/2
13	+5.0123	+5.0119	+0.4	+5	+1/2
14	+7.4920	+7.4924	-0.4	+7.5	+3/4
15	+7.5123	+7.5119	+0.4	+7.5	+3/4
16	+9.9920	+9.9924	-0.4	+10	+f/s

****

NUMBERS IN EXAMPLE ARE FOR +/- 10V INPUTS. WITH OTHER FULL SCALE VALUES THE NUMBER WILL BE DIFFERENT BUT PROPORTIONAL.

****

SECTION 10

REPLACEMENT PARTS LIST

NOTE:

DUE TO CURRENT DIFFICULTIES IN OBTAINING MANY ELECTRONIC COMPONENTS WITHIN REASONABLE DELIVERY SCHEDULES, SOME COMPONENT VALUES USED IN OUR EQUIPMENT MAY DEVIATE SLIGHTLY FROM THE DOCUMENTED VALUE. IN ALL CASES, IT HAS BEEN PREVIOUSLY VERIFIED THAT SUCH COMPONENT SUBSTITUTIONS WILL NOT DEGRADE THE PERFORMANCE OF THE CIRCUIT OR THE FINAL ASSEMBLY IN ANY MANNER. IN THE EVENT THAT ONE OF THESE SUBSTITUTED COMPONENTS SHOULD REQUIRE REPLACEMENT, THE CUSTOMER MAY USE AS A REPLACEMENT EITHER THE DOCUMENTED COMPONENT OR THE INSTALLED COMPONENT.

PART NO.	QTY	PRICE	DESCRIPTION	
8-02	5	.90	JACK TIP RED	
			JOHNSON E F	105-0602-001
8-03	1	1.12	JACK TIP BLACK	
			JOHNSON E F	105-0603-001
8-07	1	1.56	CHOKE 1/2W 10%	5.6UH
			MILLER J W	9330-18
17-00	4	2.04	CLAMP CABLE	
			AMPHENOL	AN 3057-6A
43-05	24	.04	PUSHNUT	
			PALNUT	PR312075
43-06	2	.02	PUSHNUT	
			PALNUT	PS250385
47-01	4	.44	CAPACITOR	1PF
			ELMENCO	DM15-C-010-D
47-02	141	.44	CAPACITOR	2PF
			ELMENCO	DM15-020-D
48-00	145	.44	CAPACITOR	3PF
			ELMENCO	DM15-030-D
50-00	1	.44	CAPACITOR	5PF
			ELMENCO	DM15-050-D
50-01	45	.40	CAPACITOR	5PF
			ERIE	831-000-COGO-509C
52-00	2	.29	CAPACITOR 5%	10PF
			ELMENCO	DM15-100J
52-01	201	.40	CAPACITOR 5%	10PF
			ERIE	831-000-COGO-42100D
53-02	2	.15	CAPACITOR 5%	15PF
			ERIE	801-000-COGO-150J
55-01	47	.40	CAPACITOR 5%	22PF
			ERIE	801-000-COGO-220J
56-01	82	.45	CAPACITOR 5%	30PF
			ELMENCO	DM15-300J
58-01	5	.40	CAPACITOR 10%	47PF
			ERIE	831-000-X5FO-470K
60-01	1	.35	CAPACITOR 10%	68PF
			ERIE	831-000-X5FO-680K
61-01	241	.23	CAPACITOR 10%	100PF
			ERIE	831-000-X5FO-101K
63-02	1	.80	CAPACITOR 10%	150PF
			ERIE	831-000-X5FO-151K
64-01	1	.56	CAPACITOR 5%	200PF
			MALLORY	SX320
67-01	1	.23	CAPACITOR 10%	220PF
			ERIE	831-000-X5FO-221K
68-03	1	.23	CAPACITOR 10%	330PF
			ERIE	831-000-X5FO-331K
72-01	28	.25	CAPACITOR 10%	470PF
			ERIE	831-000-X5FO-471K
76-00	4	.92	CAPACITOR 5%	1000PF
			ELMENCO	DM15-102J

PART NO.	QTY	PRICE	DESCRIPTION
76-02	3	.35	CAPACITOR 20% 1000PF ERIE CK60AW102M
77-01	44	1.83	CAPACITOR TRIMMER 9-35PF ERIE 538-006-D9-35
78-01	15	1.83	CAPACITOR TRIMMER 3-15PF ERIE 538-006-D3-15
79-01	15	1.65	CAPACITOR TRIMMER 2-8PF ERIE 538-006A2-8
93-00	1	.48	CAPACITOR 10% .01UF ELMENCO 1DP-1-103
93-01	366	.16	CAPACITOR 10% .01UF ERIE 805-000-X5V0-103Z
111-00	2	.87	CAPACITOR 20% .1UF SPRAGUE 5C023104X0500B3
116-00	114	.72	CAPACITOR 2UF 50V CDE NLW-2-50
130-01	1	3.38	CAPACITOR 20% 2UF ELPAC B1A205
131-00	226	.80	CAPACITOR 20% 2.2UF 20V SPRAGUE CS13BE225M
133-00	72	.84	CAPACITOR 20% 2.2UF 35V SPRAGUE CS13BF225M
142-00	2	.66	CAPACITOR 10UF 25V CDE NLW-10-25
142-01	58	.80	CAPACITOR 10UF 50V CDE NLW-10-50
144-00	32	.96	CAPACITOR 20% 22UF 15V SPRAGUE CS13BD226M
145-02	8	1.17	CAPACITOR 50UF 50V CDE NLW-50-50
147-00	10	1.49	CAPACITOR 100UF 16V CDE NLW-100-16
147-01	2	3.98	CAPACITOR 20% 100UF 20V SPRAGUE CS13BE107M
157-17	8	4.48	CAPACITOR 13000UF 15V SPRAGUE 36D133G015AC2A
157-23	8	3.38	CAPACITOR 5500UF 40V SPRAGUE 36D552G040AC2A
160-05	1	14.68	CONNECTOR 18 PIN HOODED WINCHESTER MRAC-18P-JTC6-H9
161-01	1	5.53	CONNECTOR 18 SOCKET WINCHESTER MRAC-18S-J6
163-04	1	17.30	CONNECTOR 34 PIN HOODED WINCHESTER MRAC-34P-JTD-H9
165-00	1	4.40	CONNECTOR 34 SOCKET WINCHESTER MRAC-34S-J6
166-02	1	18.45	CONNECTOR 50 PIN HOODED WINCHESTER MRAC-50P-JTD-H9
166-04	3	17.60	CONNECTOR 50 PIN HOODED WINCHESTER MRAC-50P-JTD-H8

PART NO.	QTY	PRICE	DESCRIPTION
167-00	3	5.95	CONNECTOR 50 SOCKET
			WINCHESTER MRAC-50S-J6
169-00	2	6.83	CONNECTOR 75 SOCKET
			WINCHESTER MRAC-75S-J6
171-03	2	14.88	CONNECTOR 75 PIN HOODED
			WINCHESTER MRAC-75P-JTD-H8
172-02	2	9.50	CONNECTOR 104 SOCKET
			WINCHESTER MRAC-104S-J6
172-03	2	23.55	CONNECTOR 104 PIN HOODED
			WINCHESTER MRAC-104P-JTD-H9
177-00	1	3.40	CONNECTOR 5 PIN
			CANNON MS3102A-14S-5P
178-00	3	4.35	CONNECTOR 5 SOCKET
			CANNON MS3102A-14S-5S
182-02	2	5.23	CONNECTOR FLANGED INLET
			ARROW-HART 7486
191-00	2	7.90	CONNECTOR 5 SOCKET
			CANNON MS3107A-14S-5S
192-00	3	8.75	CONNECTOR 5 PIN
			CANNON MS3107A-14S-5P
232-03	2	.56	DIODE ZENER 1N5227B
			MOTOROLA 1N5227B
234-02	7	.48	DIODE ZENER 1N5235B
			MOTOROLA 1N5235B
235-01	5	.48	DIODE ZENER 1N5239B
			MOTOROLA 1N5239B
237-00	96	.48	DIODE ZENER 1N5242B
			MOTOROLA 1N5242B
238-00	1	10.00	DIODE ZENER 1N825
			MOTOROLA 1N825
239-00	1,222	.13	DIODE 1N4148
			1N4148
239-01	193	.18	DIODE 1N914B
			FAIRCHILD 1N914B
240-80	84	.45	DIODE ZENER 1N962B
			MOTOROLA 1N962B
244-01	1	.19	DIODE 1N4001
			MOTOROLA 1N4001
244-03	4	.72	DIODE ZENER 1N5223B
			MOTOROLA 1N5223B
244-04	1	.76	DIODE ZENER 1N5221B
			MOTOROLA 1N5221B
244-08	52	.48	DIODE ZENER 1N5232B
			MOTOROLA 1N5232B
246-01	4	8.75	RECTIFIER BRIDGE MDA952-2
			MOTOROLA MDA952-2
247-20	134	.48	DIODE ZENER 1N5255B
			MOTOROLA 1N5255B
248-06	207	.48	DIODE ZENER 1N5231B
			MOTOROLA 1N5231B

PART NO.	QTY	PRICE	DESCRIPTION	
248-07	22	1.04	DIODE ZENER	1N5236B
			MOTOROLA	1N5236B
248-08	11	.48	DIODE ZENER	1N5234B
			MOTOROLA	1N5234B
248-10	38	.48	DIODE ZENER	1N5240B
			MOTOROLA	1N5240B
248-12	86	.48	DIODE ZENER	1N5245B
			MOTOROLA	1N5245B
248-13	66	.48	DIODE ZENER	1N5241B
			MOTOROLA	1N5241B
248-14	29	2.69	DIODE ZENER	1N5237B
			MOTOROLA	1N5237B
248-20	20	.48	DIODE ZENER	1N5253B
			MOTOROLA	1N5253B
248-22	20	2.40	DIODE	5082-2810
			HEWLETT PACK	5082-2810
248-26	23	.78	DIODE L.E.D.	135-3510
			ELDEMA	135-3510 (ALT FLV111
248-27	20	2.25	DIODE	5082-2800
			HEWLETT PACK	5082-2800
256-04	2	21.88	FAN	
			IMC	WS2107FL
257-01	4	5.13	FINGER GUARD	
			PAMOTOR	5504
261-02	8	1.30	FERRULE HANDLE	
			USECO	904-17
261-14	100	.44	FERRULE TERMASHIELD	
			AMP	323932
262-00	200	.42	FERRULE	
			AMP	323930
266-01	1	1.32	FUSE 2AMP 3AG SLO-BLO	
			LITTLEFUSE	313002
267-01	1	1.36	FUSE 3AMP 3AG SLO-BLO	
			LITTLEFUSE	313003
274-00	2	1.60	FUSEHOLDER	
			LITTLEFUSE	342004
280-05	4	6.25	HANDLE CABINET	
			USECO	1093-17
284-01	86	.60	HEAT SINK	
			IERC	TXBF-032-025B
296-00	82	.24	NUT LOCK 4-40	
			ANY	NAS679-A04
297-00	60	.25	NUT LOCK 6-32	
			ANY	NAS679-A06
298-00	4	.26	NUT LOCK 8-32	
			ANY	NAS679-A08
299-00	8	.25	NUT LOCK 10-32	
			ANY	NAS679-A3
313-00	8	.10	NUT 8-32	
			WALLACE	AN340-C8

PART NO.	QTY	PRICE	DESCRIPTION	
318-00	107	.04	NUT 4-40	
			WALLACE	NAS-671-C4
318-01	156	.08	NUT 4-40	
			COML	
326-00	115	.25	TRANSISTOR PAD	
			MILTON ROSS	10099-N
327-00	112	.21	TRANSISTOR PAD	
			DELBERT BLIN	606-600-D
331-00	610	.41	CONTACT PIN	
			WINCHESTER	100-2020P
332-00	560	.72	CONTACT SOCKET	
			WINCHESTER	100-2020S
340-07	2	2.70	POTENTIOMETER	20
			SPECTROL	43P-200
341-04	1	2.63	POTENTIOMETER	100
			SPECTROL	62-2-1-101
342-01	13	2.70	POTENTIOMETER	100
			SPECTROL	43P-101
344-07	31	2.63	POTENTIOMETER	500
			SPECTROL	43P-501
344-80	9	3.13	POTENTIOMETER	500
			SPECTROL	62-2-1-501
346-80	11	2.63	POTENTIOMETER	2K
			SPECTROL	62-2-1-202
347-01	16	2.70	POTENTIOMETER	2K
			SPECTROL	43P-202
351-80	59	3.13	POTENTIOMETER	5K
			SPECTROL	62-2-1-502
352-01	72	2.50	POTENTIOMETER	5K
			SPECTROL	43P-502
358-80	4	2.63	POTENTIOMETER	10K
			SPECTROL	62-2-1-103
359-03	106	2.70	POTENTIOMETER	10K
			SPECTROL	43P-103
360-03	78	2.63	POTENTIOMETER	20K
			SPECTROL	62-2-1-203
361-01	1	3.00	POTENTIOMETER	25K
			SPECTROL	62-2-1-253
361-81	2	3.75	POTENTIOMETER	25K
			SPECTROL	62-3-1-253
362-00	1	1.90	POTENTIOMETER	50K
			PRESTON	12004
369-02	20	2.54	POTENTIOMETER	50K
			SPECTROL	62-2-1-503
372-03	5	2.70	POTENTIOMETER	50K
			SPECTROL	43P-503
373-04	4	2.34	POTENTIOMETER	100K
			SPECTROL	43P-104
374-02	6	2.55	THERMISTOR	5K
			FENWAL	JA-35J1

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PART NO.	QTY	PRICE	DESCRIPTION
374-04	1	2.55	THERMISTOR 1K FENWAL JB-31J1
374-05	44	1.89	THERMISTOR 10K FENWAL JA-41J1
386-03	76	.49	RESISTOR 1/8W 1% 402 CORNING NC4-4020-F
387-07	36	.48	RESISTOR 1/8W 1% 2490 CORNING NC4-2491-F
387-08	2	.49	RESISTOR 1/8W 1% 1K CORNING NC4-1001-F
387-09	1	.44	RESISTOR 1/8W 1% 1180 CORNING NC4-1181-F
388-02	74	.49	RESISTOR 1/8W 1% 3740 CORNING NC4-3741-F
389-01	148	.49	RESISTOR 1/8W 1% 4990 CORNING NC4-4991-F
389-02	3	.49	RESISTOR 1/8W 1% 5490 CORNING NC4-5491-F
390-03	37	.49	RESISTOR 1/8W 1% 6040 CORNING NC4-6041-F
390-04	38	.49	RESISTOR 1/8W 1% 7500 CORNING NC4-7501-F
390-05	15	.49	RESISTOR 1/8W 1% 10K CORNING NC4-1002-F
390-15	5	.49	RESISTOR 1/8W 1% 12.1K CORNING NC4-1212-F
390-19	5	.49	RESISTOR 1/8W 1% 14.7K CORNING NC4-1472-F
392-00	37	.49	RESISTOR 1/8W 1% 20K CORNING NC4-2002-F
392-01	37	.49	RESISTOR 1/8W 1% 24.9K CORNING NC4-2492-F
393-05	74	.49	RESISTOR 1/8W 1% 100K CORNING NC4-1003-F
394-12	8	.49	RESISTOR 1/4W 1% 49.9 CORNING NC5-49R9-F
394-22	2	.49	RESISTOR 1/4W 1% 61.9 CORNING NC5-61R9-F
395-13	1	.49	RESISTOR 1/4W 1% 88.7 CORNING NC5-88R7-F
397-13	3	.49	RESISTOR 1/4W 1% 100 CORNING NC5-1000-F
401-04	34	.49	RESISTOR 1/4W 1% 402 CORNING NC5-4020-F
401-28	5	.49	RESISTOR 1/4W 1% 280 CORNING NC5-2800-F
402-01	1	.49	RESISTOR 1/4W 1% 523 CORNING NC5-5230-F
402-02	28	.49	RESISTOR 1/4W 1% 499 CORNING NC5-4990-F

PART NO.	QTY	PRICE	DESCRIPTION
405-00	12	.49	RESISTOR 1/4W 1% 590 CORNING NC5-5900-F
405-01	8	.49	RESISTOR 1/4W 1% 619 CORNING NC5-6190-F
407-00	4	.49	RESISTOR 1/4W 1% 750 CORNING NC5-7500-F
408-00	3	.49	RESISTOR 1/4W 1% 806 CORNING NC5-8060-F
408-03	5	.49	RESISTOR 1/4W 1% 887 CORNING NC5-8870-F
409-00	33	.49	RESISTOR 1/4W 1% 1K CORNING NC5-1001-F
413-00	6	.49	RESISTOR 1/4W 1% 1240 CORNING NC5-1241-F
414-00	4	.49	RESISTOR 1/4W 1% 1370 CORNING NC5-1371-F
421-00	1	.49	RESISTOR 1/4W 1% 1870 CORNING NC5-1871-F
422-00	15	.49	RESISTOR 1/4W 1% 2K CORNING NC5-2001-F
425-00	1	.49	RESISTOR 1/4W 1% 2370 CORNING NC5-2371-F
427-00	15	.49	RESISTOR 1/4W 1% 2490 CORNING NC5-2491-F
436-02	1	.49	RESISTOR 1/4W 1% 3320 CORNING NC5-3321-F
439-01	10	.49	RESISTOR 1/4W 1% 3740 CORNING NC5-3741-F
439-02	1	.49	RESISTOR 1/4W 1% 3920 CORNING NC5-3921-F
440-00	65	.49	RESISTOR 1/4W 1% 4020 CORNING NC5-4021-F
444-00	1	.44	RESISTOR 1/4W 1% 4870 CORNING NC5-4871-F
445-00	33	.49	RESISTOR 1/4W 1% 4990 CORNING NC5-4991-F
445-02	2	.44	RESISTOR 1/4W 1% 5360 CORNING NC5-5361-F
446-00	3	.40	RESISTOR 1/4W 1% 5490 CORNING NC5-5491-F
446-10	2	.49	RESISTOR 1/4W 1% 5620 CORNING NC5-5621-F
448-00	101	.49	RESISTOR 1/4W 1% 6040 CORNING NC5-6041-F
451-06	46	.49	RESISTOR 1/4W 1% 7500 CORNING NC5-7501-F
455-01	5	.49	RESISTOR 1/4W 1% 9530 CORNING NC5-9531-F
456-01	1	.49	RESISTOR 1/4W 1% 10.2K CORNING NC5-1022-F

PART NO.	QTY	PRICE	DESCRIPTION
456-03	17	.49	RESISTOR 1/4W 1% 10K CORNING NC5-1002-F
458-01	5	.49	RESISTOR 1/4W 1% 11.5K CORNING NC5-1152-F
459-00	6	.49	RESISTOR 1/4W 1% 12.4K CORNING NC5-1242-F
460-03	96	.49	RESISTOR 1/4W 1% 15.8K CORNING NC5-1582-F
463-00	96	.49	RESISTOR 1/4W 1% 18.2K CORNING NC5-1822-F
465-02	14	.49	RESISTOR 1/4W 1% 20K CORNING NC5-2002-F
465-05	1	.49	RESISTOR 1/4W 1% 20.5K CORNING NC5-2052-F
467-01	1	.49	RESISTOR 1/4W 1% 28.7K CORNING NC5-2872-F
467-03	6	.49	RESISTOR 1/4W 1% 24.9K CORNING NC5-2492-F
468-01	3	.48	RESISTOR 1/4W 1% 29.4K CORNING NC5-2942-F
469-00	2	.49	RESISTOR 1/4W 1% 33.2K CORNING NC5-3322-F
469-01	1	.49	RESISTOR 1/4W 1% 34K CORNING NC5-3402-F
471-03	9	.49	RESISTOR 1/4W 1% 40.2K CORNING NC5-4022-F
472-25	2	.49	RESISTOR 1/4W 1% 49.9K CORNING NC5-4992-F
475-02	1	.45	RESISTOR 1/4W 1% 78.7K CORNING NC5-7872-F
476-00	2	.44	RESISTOR 1/4W 1% 82.5K CORNING NC5-8252-F
477-25	5	.49	RESISTOR 1/4W 1% 124K CORNING NC5-1243-F
478-00	10	.49	RESISTOR 1/4W 1% 100K CORNING NC5-1003-F
478-05	3	.45	RESISTOR 1/4W 1% 154K CORNING NC5-1543-F
478-16	6	.49	RESISTOR 1/4W 1% 133K CORNING NC5-1333-F
479-00	9	.49	RESISTOR 1/4W 1% 200K CORNING NC5-2003-F
479-02	3	.45	RESISTOR 1/4W 1% 249K CORNING NC5-2493-F
481-02	2	.49	RESISTOR 1/4W 1% 332K CORNING NC5-3323-F
483-00	2	.49	RESISTOR 1/4W 1% 392K CORNING NC5-3923-F
483-03	2	.49	RESISTOR 1/4W 1% 402K CORNING NC5-4023-F

PART NO.	QTY	PRICE	DESCRIPTION
484-00	8	.49	RESISTOR 1/4W 1% 499K
			CORNING NC5-4993-F
488-02	2	1.62	RESISTOR 1/4W 1% 2.49M
			DALE DC-1/4
488-11	12	.40	RESISTOR 1/2W 1% 2M
			CORNING NC6-2004-F
488-16	28	.49	RESISTOR 1/4W 1% 1M
			CORNING NC5-1004-F
488-20	72	1.00	RESISTOR 1/8W 1% 2M
			DALE DC-1/8
494-05	3	.45	RESISTOR 1/2W 1% 806
			CORNING NC6-8060-F
495-00	9	.49	RESISTOR 1/2W 1% 1K
			CORNING NC6-1001-F
495-06	3	.44	RESISTOR 1/2W 1% 1580
			CORNING NC6-1581-F
496-02	3	.44	RESISTOR 1/2W 1% 3160
			CORNING NC6-3161-F
496-05	3	.49	RESISTOR 1/2W 1% 3240
			CORNING NC6-3241-F
520-00	105	.10	RESISTOR 1/4W 10% 10
			ALLEN-BRADLE CB1001
521-00	449	.11	RESISTOR 1/4W 10% 22
			ALLEN-BRADLE CB2201
522-00	34	.10	RESISTOR 1/4W 10% 33
			ALLEN-BRADLE CB3301
523-00	257	.10	RESISTOR 1/4W 10% 47
			ALLEN-BRADLE CB4701
525-00	329	.11	RESISTOR 1/4W 10% 100
			ALLEN-BRADLE CB1011
525-03	3	.15	RESISTOR 1/4W 10% 150
			ALLEN-BRADLE CB1511
526-00	23	.11	RESISTOR 1/4W 10% 180
			ALLEN-BRADLE CB1811
527-00	32	.11	RESISTOR 1/4W 10% 220
			ALLEN-BRADLE CB2211
528-00	10	.11	RESISTOR 1/4W 10% 330
			ALLEN-BRADLE CB3311
529-00	105	.11	RESISTOR 1/4W 10% 470
			ALLEN-BRADLE CB4711
530-00	2	.11	RESISTOR 1/4W 10% 680
			ALLEN-BRADLE CB6811
531-00	220	.11	RESISTOR 1/4W 10% 1K
			ALLEN-BRADLE CB1021
533-00	90	.10	RESISTOR 1/4W 10% 2200
			ALLEN-BRADLE CB2221
534-00	2	.11	RESISTOR 1/4W 10% 2700
			ALLEN-BRADLE CB2721
535-00	182	.11	RESISTOR 1/4W 10% 3300
			ALLEN-BRADLE CB3321

PART NO.	QTY	PRICE	DESCRIPTION
536-00	124	.10	RESISTOR 1/4W 10% 4700
			ALLEN-BRADLE CB4721
537-00	3	.10	RESISTOR 1/4W 10% 6800
			ALLEN-BRADLE CB6821
538-00	670	.10	RESISTOR 1/4W 10% 10K
			ALLEN-BRADLE CB1031
540-00	12	.08	RESISTOR 1/4W 10% 15K
			ALLEN-BRADLE CB1531
541-00	12	.10	RESISTOR 1/4W 10% 22K
			ALLEN-BRADLE CB2231
544-00	151	.10	RESISTOR 1/4W 10% 47K
			ALLEN-BRADLE CB4731
546-00	2	.34	RESISTOR 1/4W 10% 68K
			ALLEN-BRADLE CB6831
547-00	148	.10	RESISTOR 1/4W 10% 100K
			ALLEN-BRADLE CB1041
551-00	1	.11	RESISTOR 1/4W 10% 1M
			ALLEN-BRADLE CB1051
555-00	2	.10	RESISTOR 1/4W 10% 4.7M
			ALLEN-BRADLE CB4751
555-01	5	.11	RESISTOR 1/4W 10% 10M
			ALLEN-BRADLE CB1061
558-04	4	.22	RESISTOR 1/2W 5% 1
			ALLEN-BRADLE EB10G5
558-06	8	.23	RESISTOR 1/2W 5% 2
			ALLEN-BRADLE EB20G5
558-08	1	.52	RESISTOR 1/2W 5% 3
			ALLEN-BRADLE EB30G5
559-00	2	.11	RESISTOR 1/2W 10% 4.7
			ALLEN-BRADLE EB47G1
560-00	7	.10	RESISTOR 1/2W 10% 10
			ALLEN-BRADLE EB1001
561-00	67	.11	RESISTOR 1/2W 10% 22
			ALLEN-BRADLE EB2201
563-00	10	.12	RESISTOR 1/2W 10% 47
			ALLEN-BRADLE EB4701
565-00	7	.10	RESISTOR 1/2W 10% 100
			ALLEN-BRADLE EB1011
566-00	21	.28	RESISTOR 1/2W 10% 150
			ALLEN-BRADLE EB1511
602-09	4	2.49	RESISTOR3.75W 1% 560
			DALE RS-2B
607-04	96	.29	RESISTOR 2W 10% 100
			ALLEN-BRADLE HB1011
608-00	6	1.68	RESISTOR 3W 5% 1
			SPRAGUE 242E1R05
608-03	1	2.40	RESISTOR 3W 5% .5
			DALE RS-2B
608-07	1	2.07	RESISTOR 3W 5% 2
			SPRAGUE 450E2R05

PART NO.	QTY	PRICE	DESCRIPTION
609-80	48	1.24	RESISTOR 5W 5% 20
			SPRAGUE 243E2005
609-95	1	1.86	RESISTOR 5W 5% .5
			REIDON UT-3
624-00	24	.05	SCREW FILL 4-40 X 3/8
			ANY AN500D-4-6
641-00	60	.05	SCREW FHMS 6-32 X 3/8
			ANY AN507C-632-R6
655-02	4	.17	SCREW SET 4-40 X 1/8
			ANY AN565-D4-H2
659-00	120	.03	SCREW PHMS 2-56 X 5/16
			ANY MS35216-4
663-00	2	.03	SCREW PHMS 4-40 X 3/16
			ANY MS35216-11
665-00	83	.04	SCREW PHMS 4-40 X 5/16
			ANY MS35216-13
666-00	93	.04	SCREW PHMS 4-40 X 3/8
			ANY MS35216-14
667-00	6	.05	SCREW PHMS 4-40 X 7/16
			ANY MS35216-15
668-00	156	.04	SCREW PHMS 4-40 X 1/2
			ANY MS35216-16
672-00	8	.07	SCREW PHMS 4-40 X 1
			ANY MS35216-20
675-00	4	.05	SCREW PHMS 6-32 X 3/8
			ANY MS35216-25
679-00	16	.06	SCREW PHMS 6-32 X 3/4
			ANY MS35216-29
700-00	8	.25	SCREW HEX 10-32 X 5/8
			ANY TF538C-1032-10
721-03	2	3.10	SOCKET 8 PIN
			AUGAT 8058-1G49
724-00	40	.24	SCREW HEX HD 10-32 X 3/8
			WALLACE TF538C-1032-6
754-01	2	3.10	SWITCH TOGGLE
			CUTLER/HAM 8360K7
756-02	2	4.95	SWITCH PUSHBUTTON
			C&K P8121-2/DRESS NUT
764-01	14	2.79	SWITCH TOGGLE
			C&K 7101/DRESSNUT
793-00	1	.24	LUG CRIMP
			AMP 320882
794-00	8	.44	LUG CRIMP
			AMP 31881
800-02	2	3.73	THERMOSTAT
			TEXAS INST 20700L79-648L155-2.5
824-00	65	1.53	TRANSISTOR 2N1132
			MOTOROLA 2N1132
828-00	101	.84	TRANSISTOR 2N1711
			RAYTHEON 2N1711

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PART NO.	QTY	PRICE	DESCRIPTION
830-02	62	.84	TRANSISTOR 2N2219A
			NATIONAL 2N2219A
838-02	47	1.20	TRANSISTOR 2N2905A
			NATIONAL 2N2905A
838-04	42	3.00	TRANSISTOR 2N2914
			MOTOROLA 2N2914
839-00	2	3.95	TRANSISTOR 2N2916
			TEXAS INST 2N2916
842-01	11	.80	TRANSISTOR 2N4264
			MOTOROLA 2N4264
845-05	8	7.30	TRANSISTOR SELECTED 9932
			SILICONIX 9932
845-08	2	4.00	TRANSISTOR DN1011
			SILICONIX DN1011
845-10	15	6.60	TRANSISTOR E7001
			SILICONIX E7001
846-00	667	.37	TRANSISTOR 2N3904
			MOTOROLA 2N3904
846-01	505	.37	TRANSISTOR 2N3906
			MOTOROLA 2N3906
846-03	34	1.36	TRANSISTOR 2N4921
			MOTOROLA 2N4921
846-08	113	3.25	TRANSISTOR 2N4939
			MOTOROLA 2N4939
846-10	37	1.10	TRANSISTOR 2N4918
			MOTOROLA 2N4918
847-01	146	2.64	TRANSISTOR SELECTED 9934
			UNION CARBID 9934
847-12	84	14.30	TRANSISTOR 2N5516
			SILICONIX 2N5516
847-15	6	14.90	TRANSISTOR 2N5564
			SILICONIX 2N5564
847-19	2	10.38	TRANSISTOR 2N5912
			SILICONIX 2N5912
848-09	3	1.08	INTEGRATED CIRCUIT 74H30
			ANY 74H30 (PLASTIC)
848-12	23	.70	INTEGRATED CIRCUIT 74H40
			ANY 74H40 (PLASTIC)
848-14	14	1.08	INTEGRATED CIRCUIT 74H00
			ANY 74H00 (PLASTIC)
848-15	1	3.75	INTEGRATED CIRCUIT 74154
			ANY 74154 (ALT 9311)
848-16	3	1.20	INTEGRATED CIRCUIT 74H08
			ANY 74H08 (PLASTIC)
848-17	24	2.64	INTEGRATED CIRCUIT 74155
			ANY 74155 (PLASTIC)
848-23	4	3.28	INTEGRATED CIRCUIT MC3026P
			MOTOROLA MC3026P (PLASTIC)
848-24	22	1.08	INTEGRATED CIRCUIT 74H50
			ANY 74H50 (PLASTIC)

PART NO.	QTY	PRICE	DESCRIPTION
848-27	5	1.96	INTEGRATED CIRCUIT 7475
			ANY 7475 (PLASTIC)
848-28	18	1.20	INTEGRATED CIRCUIT 74H11
			ANY 74H11 (PLASTIC)
848-32	1	2.34	INTEGRATED CIRCUIT CA3019
			RCA CA3019 (MT CAN)
848-40	7	1.08	INTEGRATED CIRCUIT 74H04
			ANY 74H04 (PLASTIC)
848-48	13	1.08	INTEGRATED CIRCUIT 74H10
			ANY 74H10 (PLASTIC)
848-58	6	1.50	INTEGRATED CIRCUIT 74157
			ANY 74157 (ALT 9322)
848-59	2	1.80	INTEGRATED CIRCUIT 74161
			ANY 74161 (ALT 9316)
848-60	2	1.03	INTEGRATED CIRCUIT 7486
			ANY 7486 (PLASTIC)
848-65	5	1.96	INTEGRATED CIRCUIT MC1710CP
			MOTOROLA MC1710CP (PLASTIC)
848-77	5	1.74	INTEGRATED CIRCUIT 74H74
			ANY 74H74 (PLASTIC)
848-98	10	1.40	INTEGRATED CIRCUIT 8601
			ANY 8601 (ALT 9601)
849-45	2	2.50	INTEGRATED CIRCUIT 78M15UC
			FAIRCHILD 78M15UC
849-49	6	6.25	INTEGRATED CIRCUIT LF355H
			NATIONAL LF355H (MT CAN)
849-50	2	3.15	INTEGRATED CIRCUIT 79M15UC
			FAIRCHILD 79M15UC
851-00	1	.09	WASHER I.T. 3/8
			SMITH 1145
854-00	58	.02	WASHER FLAT #6 SM
			WALLACE NAS 620-C6
855-00	410	.02	WASHER FLAT #4 SM
			WALLACE NAS 620-C4
857-02	72	.06	WASHER FLAT #4 FIBRE
			SEASTROM 5602-10-32
859-00	13	.10	WASHER SHOULDER #4 NYLON
			SEASTROM 5607-10
859-01	1	.10	WASHER SHOULDER BUSHING NYLON
			BENDIX 2106307
859-02	7	.31	WASHER SHOULDER NYLON
			SEASTROM 5607-11
863-00	2	.02	WASHER E.T. #6
			WALLACE AN936-B6
863-02	2	.02	WASHER E.T. #8
			WALLACE AN936-B8
864-00	32	.01	WASHER E.T. # 10
			WALLACE AN936-B10
869-00	16	.02	WASHER FLAT #6 STD
			WALLACE AN960-C6

PART NO.	QTY	PRICE	DESCRIPTION
871-00	8	.18	WASHER FLAT #8 WALLACE AN960-C8L
872-00	16	.03	WASHER FLAT #10 WALLACE AN960-C10L
874-00	222	.01	WASHER LOCK #4 WALLACE MS35337-78
876-00	3	.02	WASHER LOCK #8 WALLACE MS35337-80
877-00	8	.03	WASHER LOCK #10 WALLACE MS35337-81
972-02	1	38.50	CHASSIS SLIDE ZERO MFG C-300S-24-E98
998-07	2	4.68	RESISTOR .02% 796 VISHAY V53-1-796
998-10	10	4.68	RESISTOR .02% 1K VISHAY V53-1-1K
998-15	2	4.00	RESISTOR .02% 1593.4 VISHAY V53-1-1593.4
998-16	2	4.00	RESISTOR .02% 1587.7 VISHAY V53-1-1587.7
998-20	1	2.37	RESISTOR .02% 1996 VISHAY V53-1-1996
998-22	1	4.38	RESISTOR .02% 2K VISHAY V53-1-2K
998-24	2	4.38	RESISTOR .02% 3160 VISHAY V53-1-3160
998-25	108	4.38	RESISTOR .02% 3988.4 VISHAY V53-1-3988.4
998-26	2	4.68	RESISTOR .02% 3200 VISHAY V53-1-3200
998-30	42	4.00	RESISTOR .02% 3992.4 VISHAY V53-1-3992.4
998-39	5	4.38	RESISTOR .02% 4K VISHAY V53-1-4K
998-40	10	4.38	RESISTOR .02% 4008 VISHAY V53-1-4008
998-42	2	4.00	RESISTOR .02% 4084 VISHAY V53-1-4084
998-46	3	4.00	RESISTOR .02% 7993.6 VISHAY V53-1-7993.6
998-47	5	4.68	RESISTOR .02% 8K VISHAY V53-1-8K
999-24	20	23.00	RESISTOR .02% 398.84 VISHAY V53-1-398.84
999-49	20	4.38	RESISTOR .02% 5K VISHAY V53-1-5K
999-71	6	4.68	RESISTOR .02% 8032 VISHAY V53-1-8032
999-77	8	9.18	RESISTOR .02% 12.5K VISHAY V53-1-12.5K

PART NO.	QTY	PRICE	DESCRIPTION	
999-83	52	9.18	RESISTOR .02% 25K VISHAY V53-1-25K	
999-86	8	4.68	RESISTOR .02% 37.5K VISHAY V53-1-37.5K	
999-87	64	11.48	RESISTOR .02% 50K VISHAY V53-1-50K	
999-94	4	11.48	RESISTOR .02% 75K VISHAY V53-1-75K	
9922-00	12	1.40	TRANSISTOR SELECT	A
9944-00	96	4.75	TRANSISTOR SELECT PAIR	A
9946-00	108	1.92	TRANSISTOR SELECT	A
9951-00	2	1.80	TRANSISTOR SELECT	A
12018-01	1	.35	SHAFT EXTENDER	B
12027-00	1	.52	BRACE SINGLE POTENTIOMETER	B
30051-03	2	1.59	KNOB CONTROL	C
31818-00	1	1.68	BUSHING	B
40341-00	156	.36	GUIDE CARD	D
40454-00	2	10.00	COVER SIDE RIGHT & LEFT	D
40455-00	2	9.55	COVER TOP & BOTTOM	D
40456-02	1	10.00	PANEL REAR 2 AMP	A
40456-03	1	10.00	PANEL REAR 3 AMP	A
40457-00	10	3.75	SUPPORT INTERCONNECT	C
40461-00	23	.45	LENS LAMP	C
40461-02	1	.25	PLUG LAMP	C
40475-00	2	.30	PLUG SWITCH	C
46003-00	1	11.25	D&R ASSY AMP/LOGIC A-B	C
46019-00	2	11.25	D&R ASSY AMP LOGIC B	C
46020-00	2	7.85	SHIELD COMPONENT SIDE	C
46021-00	6	6.50	SHIELD CIRCUIT SIDE	B

PART NO.	QTY	PRICE	DESCRIPTION	
46026-00	3	13.75	D&R ASSY AMP LOGIC C	C
46027-00	1	48.80	TRANSFORMER ASSY	C
46079-00	19	.80	HEATSINK	A
46123-00	1	13.75	D&R ASSY LOGIC BUFFER	C
46178-00	1	11.25	D&R ASSY 4 BIT LOGIC	C
48079-00	2	8.03	CABLE ASSY POWER	A
48088-00	1	30.00	D&R ASSY INTERCONN PWR SUP	C
48229-00	2	3.00	THERMOSTAT BRACKET	A
48289-00	2	18.75	D&R ASSY EXTENDER	C
50020-90	1	.00	RESISTOR .03% 222.22 PRESTON STYLE 18136	A
50040-25	4	2.70	RESISTOR .03% 1113.6 PRESTON STYLE 18136	A
50060-00	2	2.70	RESISTOR .03% 10K PRESTON STYLE 18136	A
50060-02	2	2.70	RESISTOR .03% 10.02K PRESTON STYLE 18136	A
51875-00	48	2.50	HEAT SINK	B
51982-00	2	17.00	PANEL SIDE	D
51983-00	2	8.75	COVER TOP & BOTTOM	D
52094-01	1	2.40	SHIELD PLATE	A
52099-00	1	3.75	TRANSFORMER ASSY	B
52184-00	28	7.85	SHIELD COMPONENT SIDE	C
52332-00	2	11.25	D&R ASSY SIGNAL BD EXTENDER	C
52383-00	1	13.75	D&R ASSY GMSH	C
52528-00	24	13.75	D&R ASSY 4 CHANNEL MUX	C
52533-00	1	13.75	D&R ASSY MUX COUNTER REG	C
52538-00	1	13.75	D&R ASSY ADC CONTROL	C
52548-00	1	13.75	D&R ASSY MUX DECODE 128 CHAN	C

PART NO.	QTY	PRICE	DESCRIPTION	
52582-00	2	2.64	SWITCH ASSY MODE	A
52643-00	5	13.75	D&R ASSY AMP LOGIC A	C
52804-00	1	98.00	D&R ASSY INTERCONNECT BD A	C
52809-00	1	.00	MOD DWG CHASSIS SLIDE (PAIR)	A
53068-00	2	.00	D&R ASSY GMD 10-1000	C
55742-00	2	2.40	FEED THRU TERMINAL ASSY	B
56409-00	2	.80	TEMPERATURE INSULATOR	A
56448-00	1	13.75	D&R ASSY BUFFER AMPLIFIER	C
56497-00	4	13.75	D&R ASSY GUARD DRIVER	C
56858-00	18	13.75	D&R ASSY DUAL GMD	C
58168-00	1	7.50	D&R ASSY LAMP DRIVER MUX	C
58488-00	1	13.75	D&R ASSY LOGIC BUFFER	C
58693-00	1	10.00	D&R ASSY LAMP DRIVER ADC	C
58705-00	1	16.25	PLATE CONNECTOR	B
58709-00	1	62.00	D&R ASSY INTERCONNECT BD C	C
58713-00	1	13.75	D&R ASSY SIGN STORAGE	C
58723-00	2	13.75	D&R ASSY GMD MUX AMPLIFIER	C
58837-00	1	.00	D&R ASSY INTERCONNECT BD A	C
58839-00	1	.00	D&R ASSY INTERCONNECT BD B	C
58844-00	1	.00	PLATE CONNECTOR	B
58859-00	1	.00	D&R ASSY INTERCONNECT BD C	C
58908-00	2	13.75	D&R ASSY GMD AMP/MUX NOR IN	C
58934-00	1	.00	TRANSFORMER ASSY	C
58938-00	1	.00	D&R ASSY POWER SUPPLY	C
58968-00	2	13.75	D&R ASSY MUX CONTROL STORAGE	C

PART NO.	QTY	PRICE	DESCRIPTION	
59008-00	1	13.75	D&R ASSY MUX CONTROL	C
59523-00	1	13.75	D&R ASSY 4 BIT AMP	C
59658-00	1	11.25	D&R ASSY REF SUPPLIES	C
59999-21	1	60.00	PANEL FRONT GMAD-1	D
59999-26	1	60.00	PANEL FRONT GMD	D

SECTION 11

DRAWINGS

NOTE:

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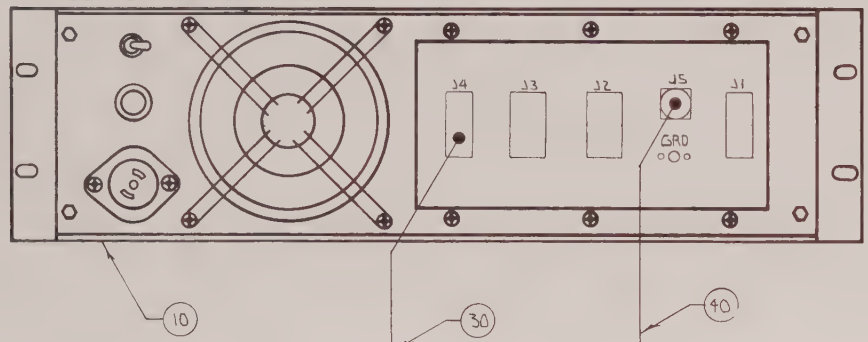
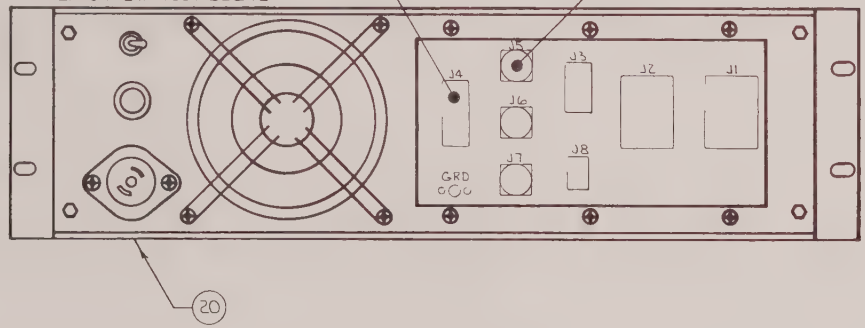
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	E.O. 5482	4-23-75	GLB
B	E.O. 5850	2-16-77	

ADC MUX ASSY 58700-03



GMD MUX ASSY 58845



(1) J1 ANALOG INPUTS 00-19
(1) J2 DIGITAL ADRESS & CONTROLS
(1) J3 DIGITAL OUTPUTS & CONTROLS
J4 DIGITAL CONTROLS TO EXPANSION MODULE
J5 ANALOG IN FROM EXPANSION MODULE

(1) J1 ANALOG INPUTS 20-53
(1) J2 ANALOG INPUTS 54,55,64-95
(1) J3 ANALOG INPUTS 96-103
J4 DIGITAL CONTROLS FROM ADC MODULE
J5 ANALOG OUTPUT TO ADC MODULE
(1) J6 ANALOG OUTPUT
(1) J7 ANALOG OUTPUT
(1) J8 CONTINUOUS ANALOG OUTPUT

2. FOR PARTS LIST SEE SHEET 2 OF 2.
(1) TO BE WIRED BY CUSTOMER.
NOTE: UNLESS OTHERWISE SPECIFIED

BY	DATE
DRAWN	6-20-74
CHK M.T.S.	6-20-74
ENGR D.L. Yamada	6-21-74
APPD	
APPD	

TITLE: SYSTEM INTERCONNECT DRAWING

MATERIAL

FINISH

SCALE NONE

SIZE C

58855

CODE

SH 1 OF 2

PRESTON
SCIENTIFIC INCORPORATED
803 East Cerritos Ave., Anaheim Calif. 92805
Tel. (714) 776-6400

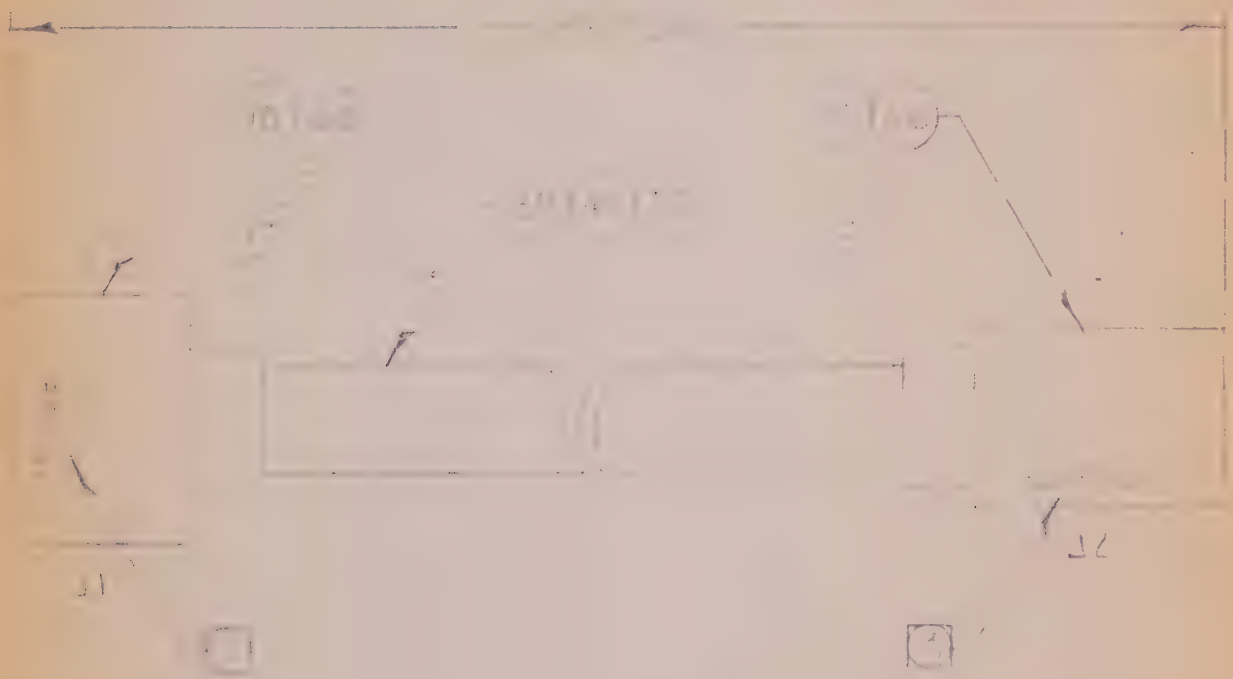
TITLE: SYSTEM INTERCONNECT
DWG NO. 58855-00 REV 1
SHEET 2 OF 4

PRESTON SCIENTIFIC INC
PRINTED 02/16/77

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
10	1	58700-03	GMAD-1 4 CHAN GMD MUX 14B&S	D
20	1	58845-00	MULTIPLEX EXPANSION MODULE	D
30	1	58856-00	INTERCONNECT CABLE ASSY	A
40	1	59001-01	INTERCONNECT CABLE ASSY	A

REVISION			
SYM	DESCRIPTION	DATE	APPROVAL



NOTE: UNLESS OTHERWISE

BY	DATE	TITLE	PRESTON
DWN			SCIENTIFIC INCORPORATED
CHK		MAT'L	505 East Cerritos Ave. Anaheim, Calif. 92805
ENG			
APP			
		FINISH	
NEXT ASSY		SIZE A	SCALE / SH 1 OF 1

[illegible] SIGNAL,PLUG,PIN NOTES

[illegible] INTERCONNECT CABLE WIRING

MAKE [illegible]

CONNECTOR [illegible]				CONNECTOR [illegible]					
MRAC	SOP	[illegible]	HP	MRAC	SOP	[illegible]	HP		
MUXAD01*		[illegible]	[illegible]	[illegible]		J2	A	ITEM	4
MUXAD01*	SH	[illegible]	[illegible]	[illegible]	SH	J2	B	ITEM	4
MUXAD02*		[illegible]	[illegible]	[illegible]		J2	C	ITEM	4
MUXAD02*	SH	[illegible]	D	MUXAD02*	SH	J2	D	ITEM	4
MUXAD04*		[illegible]	E	MUXAD04*		J2	E	ITEM	4
MUXAD04*	SH	[illegible]	[illegible]	MUXAD04*	SH	J2	F	ITEM	4
FIELD02*		[illegible]	[illegible]	FIELD02*		J2	H	ITEM	[illegible]
FIELD02*	SH	[illegible]	[illegible]	FIELD02*	SH	J2	J	ITEM	[illegible]
FIELD03*		[illegible]	K	FIELD03*		J2	K	ITEM	4
FIELD03*	SH	[illegible]	L	FIELD03*	SH	J2	L	ITEM	[illegible]
FIELD04*		[illegible]	M	FIELD04*		J2	M	ITEM	4
FIELD04*	SH	[illegible]	N	FIELD04*	SH	J2	N	ITEM	[illegible]
FIELD05*		[illegible]	P	FIELD05*		[illegible]	[illegible]	ITEM	[illegible]
FIELD05*	SH	[illegible]	R	FIELD05*	SH	[illegible]	[illegible]	ITEM	[illegible]
FIELD06*		[illegible]	S	FIELD06*		[illegible]	[illegible]	ITEM	[illegible]
FIELD06*	SH	[illegible]	T	FIELD06*	SH	[illegible]	[illegible]	ITEM	[illegible]
FIELD07*		[illegible]	U	FIELD07*		[illegible]	[illegible]	ITEM	[illegible]
FIELD07*	SH	[illegible]	V	FIELD07*	SH	[illegible]	[illegible]	ITEM	[illegible]
FIELD08*		[illegible]	W	FIELD08*		[illegible]	[illegible]	ITEM	[illegible]
FIELD08*	SH	[illegible]	X	FIELD08*	SH	[illegible]	[illegible]	ITEM	[illegible]
FIELD09*		[illegible]	Y	FIELD09*		[illegible]	[illegible]	ITEM	[illegible]
FIELD09*	SH	[illegible]	Z	FIELD09*	SH	[illegible]	[illegible]	ITEM	[illegible]
FIELD10*		[illegible]	A	FIELD10*		[illegible]	[illegible]	ITEM	[illegible]
FIELD10*	SH	[illegible]	B	FIELD10*	SH	[illegible]	[illegible]	ITEM	[illegible]
FIELD11*		[illegible]	C	FIELD11*		[illegible]	[illegible]	ITEM	[illegible]
FIELD11*	SH	[illegible]	D	FIELD11*	SH	J2	-D	ITEM	[illegible]
FIELD12*		[illegible]	E	FIELD12*		[illegible]	[illegible]	ITEM	[illegible]
FIELD12*	SH	[illegible]	F	FIELD12*	SH	J2	-F	ITEM	[illegible]
FIELD13*		[illegible]	H	FIELD13*		[illegible]	[illegible]	ITEM	[illegible]
FIELD13*	SH	[illegible]	J	FIELD13*	SH	[illegible]	[illegible]	ITEM	[illegible]
FIELD14*		[illegible]	K	FIELD14*		J2	[illegible]	ITEM	[illegible]
FIELD14*	SH	[illegible]	M	FIELD14*	SH	J2	M	ITEM	[illegible]
FIELD15*		[illegible]	N	FIELD15*		J2	N	ITEM	[illegible]
FIELD15*	SH	[illegible]	P	FIELD15*	SH	J2	[illegible]	ITEM	[illegible]
BLANK		[illegible]	R	BLANK		J2	-R		
BLANK		[illegible]	S	BLANK		J2	[illegible]		
BLANK		[illegible]	T	BLANK		J2	-T		
BLANK		[illegible]	U	BLANK		J2	-U		
BLANK		[illegible]	V	BLANK		J2	[illegible]		
BLANK		[illegible]	W	BLANK		J2	-W		
BLANK		[illegible]	X	BLANK		J2	[illegible]		
BLANK		[illegible]	Y	BLANK		J2	-Y		

	SIGNAL,PLUG,PIN		SIGNAL,PLUG,PIN	NOTES
470	BLANK	J1 -Z	BLANK J2 -Z	
480	BLANK	J1 AA	BLANK J2 AA	
490	BLANK	J1 BB	BLANK J2 BB	
(--)	BLANK	J1 CC	BLANK J2 CC	
[illegible]	BLANK	J1 DD	BLANK J2 DD	
[illegible]	BLANK	J1 EE	BLANK J2 EE	
[illegible]	LOGIC GRD	J1 FF	LOGIC GRD J2 FF ITEM [illegible]	
[illegible]	LOGIC GRD	J1 HH	LOGIC GRD J2 HH ITEM [illegible]	

TITLE: INTERCONNECT [illegible]
DWG NO. 50854-00 [illegible]
SHEET 4 OF 4

PRESTON SCIENTIFIC INC.
PRINTED 5/20/74

[illegible]

ITEM	QTY	PART NO.	DESCRIPTION
010	1	[illegible]	[illegible]
020	1	[illegible]	[illegible]
030	[illegible]	[illegible]	WIRE 18 AWG [illegible]
040	[illegible]	[illegible]	CABLE RG174/U
050	[illegible]	075	TUBING 1/2 ID [illegible]
060	[illegible]	331	CONTACT PIN

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL

BY	DATE
DWN	
CHK	
ENG	
APP	

TITLE

MAT'L

FINISH

A
SIZE

NEXT ASSY

PRESTON
SCIENTIFIC INCORPORATED
805 East Cerritos Ave., Anaheim, Calif. 92805
Tel. (714) 776-6400

SCALE

SH 1 OF

SIGNAL-DEVICE-PIN	SIGNAL-DEVICE-PIN	NOTES

SYSTEM INTERCONNECT CABLE W/RING

MALE CABLE SEVEN (7) FEET LONG

CONNECTOR J1	CONNECTOR J2
MS3107A-14S-5S	MS3107A-14S-5P

ANALOG IN	J1	A	ANALOG OUT	J2	A	ITEM 5
GUARD	J1	B	GUARD	J2	B	ITEM 5
BLANK	J1	C	BLANK	J2	C	
ANAGRD	J1	D	ANAGRD	J2	D	ITEM 4
ANAGRD	J1	E	ANAGRD	J2	E	ITEM 4

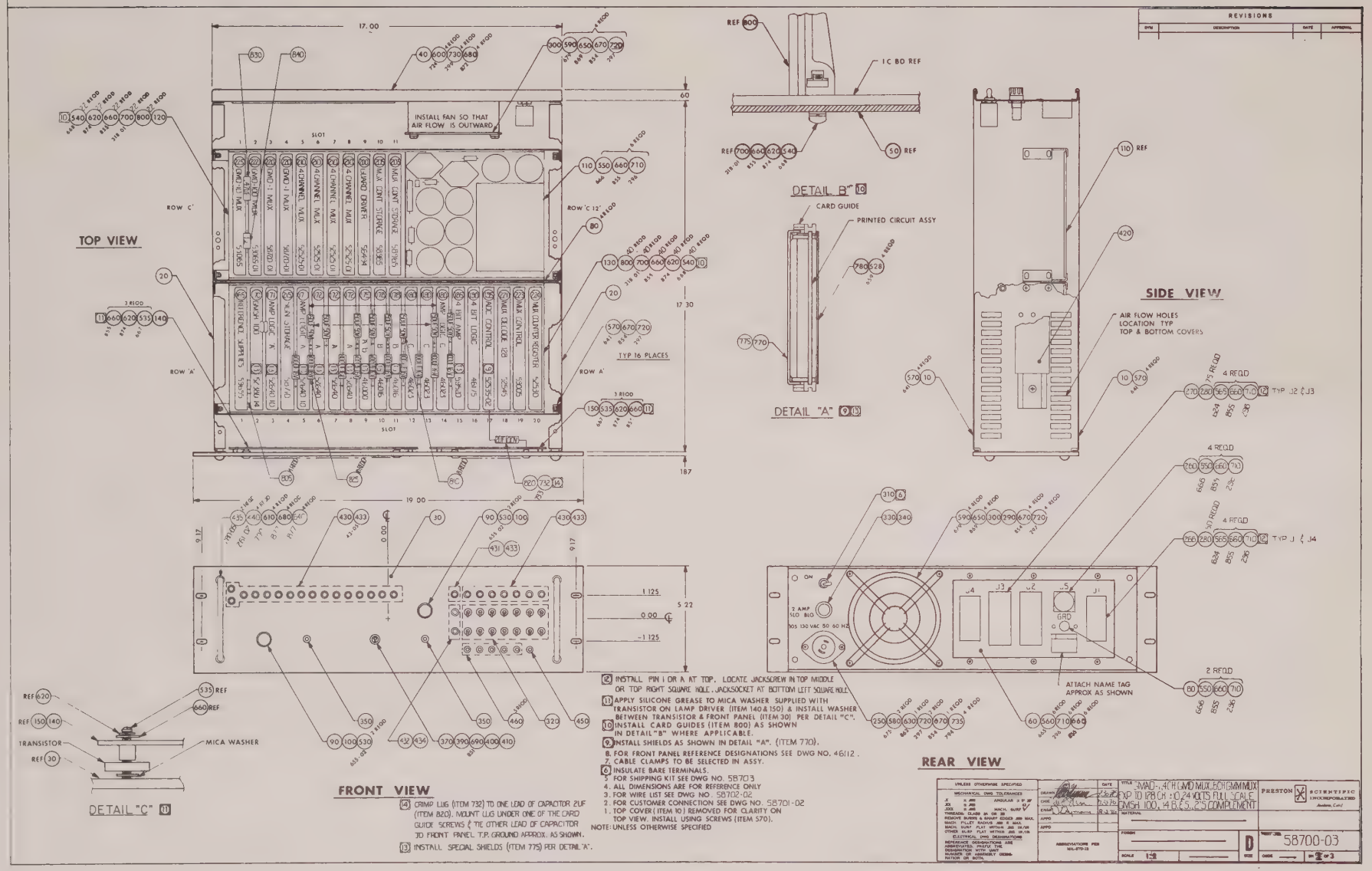
[illegible]

[illegible]

ITEM	QTY	PART NO.	DESCRIPTION
[illegible]	1	[illegible]	CONNECTOR 5 SOCKET
[illegible]	2	[illegible]	CLAMP CABLE
[illegible]	A/R	[illegible]	PRAIRIE TINNED COPPER 1/2 WIDE
[illegible]	A/R	[illegible]	TUBING [illegible] WHITE
[illegible]	A/R	[illegible]	CABLE [illegible]
[illegible]	A/R	[illegible]	WIRE 18 AWG WHITE
070	1	[illegible]	CONNECTOR 5 PIN

DRAWING NUMBER	DESCRIPTION
58700-03	TOP ASSEMBLY
58701	CUSTOMER CONNECTION
58702	WIRE LIST
52803	INTERCONNECT BOARD "A"
58708	INTERCONNEC BOARD "C"
46000	AMPLOGIC AB
46001	SCHEMATIC
46016	AMPLOGIC "B"
46017	SCHEMATIC
46023	AMP/LOGIC "C"
46024	SCHEMATIC
46175	FOUR BIT LOGIC
46176	SCHEMATIC
48085	POWER SUPPLY
58809	SCHEMATIC
52380	SAMPLE AND HOLD AMP
52381	SCHEMATIC
52525	FOUR CHANNEL MUX
52526	SCHEMATIC
52530	MUX COUNTER REGISTER
52531	SCHEMATIC
52535	ADC CONTROL
52536	SCHEMATIC
52545	MUX DECODE 128

52546	SCHEMATIC
52640	AMPLOGIC A
52641	SCHEMATIC
53065	GMD-10/1000
53066	SCHEMATIC
56494	GUARD DRIVER
56495	SCHEMATIC
58165	LAMP DRIVER MUX
58166	SCHEMATIC
56890	LAMP DRIVER ADC
56891	SCHEMATIC
58710	SIGN STORAGE
58711	SCHEMATIC
58720	MUX AMPLIFIER
58721	SCHEMATIC
58965	MUX CONTROL STORAGE
58966	SCHEMATIC
59005	MUX CONTROL
59006	SCHEMATIC
59520	FOUR BIT AMP
59521	SCHEMATIC
59655	REFERENCE SUPPLY
59656	SCHEMATIC



1. FOR CUSTOMER CONNECTION SEE DWG NO. 58701-02
2. FOR WIRE LIST SEE DWG NO. 58702-02
3. FOR SHIPPING KIT SEE DWG NO. 58703
4. ALL DIMENSIONS ARE FOR REFERENCE ONLY
5. INSULATE BARE TERMINALS.
6. CABLE CLAMPS TO BE SELECTED IN ASSY.
7. FOR FRONT PANEL REFERENCE DESIGNATIONS SEE DWG NO. 46112.
8. INSTALL PIN 1 OR A AT TOP. LOCATE JACKSCREW IN TOP MIDDLE OR TOP RIGHT SQUARE HOLE. JACKSOCKET AT BOTTOM LEFT SQUARE HOLE.
9. INSTALL SHIELDS AS SHOWN IN DETAIL "A". (ITEM 770).
10. INSTALL CARD GUIDES (ITEM 800) AS SHOWN IN DETAIL "B" WHERE APPLICABLE.
11. APPLY SILICONE GREASE TO MICA WASHER SUPPLIED WITH TRANSISTOR ON LAMP DRIVER (ITEM 140 & 150) & INSTALL WASHER BETWEEN TRANSISTOR & FRONT PANEL (ITEM 30) PER DETAIL "C".
12. CRIMP LUG (ITEM 732) TO ONE LEAD OF CAPACITOR 2UF (ITEM 820). MOUNT LUG UNDER ONE OF THE CARD GUIDE SCREWS & TIE OTHER LEAD OF CAPACITOR TO FRONT PANEL T.P. GROUND APPROX. AS SHOWN.
13. INSTALL SPECIAL SHIELDS (ITEM 775) PER DETAIL "A".

NOTE: UNLESS OTHERWISE SPECIFIED

TITLE: GMAD-1 4 CHAN GMD MUX 14B&S
DWG NO. 58700-03 REV .....
SHEET 2 OF 4

PRESTON SCIENTIFIC INC.
PRINTED 08/31/76

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
10	2	40455-00	COVER TOP & BOTTOM	D
20	2	40454-00	COVER SIDE RIGHT & LEFT	D
30	1	59999-21	PANEL FRONT GMAD-1	D
40	1	40456-02	PANEL REAR 2 AMP	A
50	4	40457-00	SUPPORT INTERCONNECT	C
60	1	58705-00	PLATE CONNECTOR	B
70	1	58703-00	SHIPPING KIT	A
80	1	55742-00	FEED THRU TERMINAL ASSY	B
90	2	30051-03	KNOB CONTROL	C
100	2	52582-00	SWITCH ASSY MODE	A
110	1	48085-36	P.C. ASSY POWER SUPPLY	AP
120	1	58709-00	D&R ASSY INTERCONNECT BD C	C
130	1	52804-00	D&R ASSY INTERCONNECT BD A	C
140	1	58690-00	P.C. ASSY LAMP DRIVER ADC	AP
150	1	58165-01	P.C. ASSY LAMP DRIVER MUX	AP
165	1	59655-00	P.C. ASSY REFERENCE SUPPLIES	AP
170	1	52380-14	P.C. ASSY GMSH	AP
171	2	52640-10	P.C. ASSY AMP LOGIC A	AP
172	3	52640-00	P.C. ASSY AMP LOGIC A	AP
175	1	46000-00	P.C. ASSY AMP/LOGIC A-B	AP
178	2	46016-00	P.C. ASSY AMP/LOGIC B	AP
180	3	46023-00	P.C. ASSY AMP/LOGIC C	AP
185	1	59520-00	P.C. ASSY 4 BIT AMP	AP
190	1	46175-00	P.C. ASSY 4 BIT LOGIC	AP
195	1	52535-02	P.C. ASSY ADC CONTROL	AP
200	1	56494-00	P.C. ASSY GUARD DRIVER	AP
205	2	58965-00	P.C. ASSY MUX CONTROL STORAGE	AP
210	4	52525-01	P.C. ASSY 4 CHANNEL MUX	AP
215	1	58710-00	P.C. ASSY SIGN STORAGE	AP
220	2	58720-01	P.C. ASSY GMD MUX AMPLIFIER	AP
221	1	52545-00	P.C. ASSY MUX DECODE 128 CHAN	AP
222	1	53065-01	P.C. ASSY GMD 10-1000	AP
223	1	59005-00	P.C. ASSY MUX CONTROL	AP
224	1	52530-00	P.C. ASSY MUX COUNTER REG	AP
225	1	53065-00	P.C. ASSY GMD 10-1000	AP
250	1	182-02	CONNECTOR FLANGED INLET	
260	1	177-00	CONNECTOR 5 PIN	
266	2	167-00	CONNECTOR 50 SOCKET	
270	2	169-00	CONNECTOR 75 SOCKET	
280	250	332-00	CONTACT SOCKET	
290	1	256-04	FAN	
300	2	257-01	FINGER GUARD	
310	1	754-01	SWITCH TOGGLE	
320	14	764-01	SWITCH TOGGLE	
330	1	266-01	FUSE 2AMP 3AG SLO-BLO	
340	1	274-00	FUSEHOLDER	
350	2	756-02	SWITCH PUSHBUTTON	
370	1	31818-00	BUSHING	B
390	1	12018-01	SHAFT EXTENDER	B
400	1	12027-00	BRACE SINGLE POTENTIOMETER	B

TITLE: GMAD-1 4 CHAN GMD MUX 14B&S
DWG NO. 58700-03 REV .....
SHEET 3 OF 4

PRESTON SCIENTIFIC INC.
PRINTED 08/31/76

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
410	1	362-00	POTENTIOMETER 50K	
420	1	52809-00	MOD DWG CHASSIS SLIDE (PAIR)	A
430	23	40461-00	LENS LAMP	C
431	1	40461-02	PLUG LAMP	C
432	2	40475-00	PLUG SWITCH	C
433	24	43-05	PUSHNUT	
434	2	43-06	PUSHNUT	
435	2	280-05	HANDLE CABINET	
440	4	261-02	FERRULE HANDLE	
450	1	8-03	JACK TIP BLACK	
460	5	8-02	JACK TIP RED	
470	A/R	997-07	WIRE 18 AWG WHITE	
480	A/R	992-10	WIRE 22 AWG WHITE	
490	A/R	989-00	WIRE 22 AWG	
500	A/R	949-00	TUBING	
510	A/R	993-20	CABLE RG174/U	
520	A/R	994-05	WIRE 22 AWG BLACK/WHITE	
528	44	659-00	SCREW PHMS 2-56 X 5/16	
530	4	655-02	SCREW SET 4-40 X 1/8	
535	6	667-00	SCREW PHMS 4-40 X 7/16	
540	62	668-00	SCREW PHMS 4-40 X 1/2	
550	12	666-00	SCREW PHMS 4-40 X 3/8	
560	6	665-00	SCREW PHMS 4-40 X 5/16	
565	16	624-00	SCREW FILL 4-40 X 3/8	
570	24	641-00	SCREW FHMS 6-32 X 3/8	
580	2	675-00	SCREW PHMS 6-32 X 3/8	
590	8	679-00	SCREW PHMS 6-32 X 3/4	
600	4	724-00	SCREW HEX HD 10-32 X 3/8	
610	4	700-00	SCREW HEX 10-32 X 5/8	
620	68	874-00	WASHER LOCK #4	
630	1	863-00	WASHER E.T. #6	
640	4	877-00	WASHER LOCK #10	
650	8	869-00	WASHER FLAT #6 STD	
660	102	855-00	WASHER FLAT #4 SM	
670	25	854-00	WASHER FLAT #6 SM	
680	8	872-00	WASHER FLAT #10	
690	1	851-00	WASHER I.T. 3/8	
700	62	318-01	NUT 4-40	
710	34	296-00	NUT LOCK 4-40	
720	26	297-00	NUT LOCK 6-32	
730	4	299-00	NUT LOCK 10-32	
732	1	793-00	LUG CRIMP	
735	4	794-00	LUG CRIMP	
740	50	261-14	FERRULE TERMASHIELD	
750	100	262-00	FERRULE	
770	1	46020-00	SHIELD COMPONENT SIDE	C
775	10	52184-00	SHIELD COMPONENT SIDE	C
780	4	46021-00	SHIELD CIRCUIT SIDE	B
800	62	40341-00	GUIDE CARD	D
805	4	93-01	CAPACITOR 10% .01UF	

TITLE: GMAD-1 4 CHAN GMD MUX 14B&S
DWG NO. 58700-03 REV .....
SHEET 4 OF 4

PRESTON SCIENTIFIC INC.
PRINTED 08/31/76

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
810	8	145-02	CAPACITOR 50UF 50V
820	1	130-01	CAPACITOR 20% 2UF
825	10	147-00	CAPACITOR 100UF 16V
830	1	120-00	CAPACITOR 20% .47UF
840	1	558-04	RESISTOR 1/2W 5% 1

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL

	BY	DATE
DWN		2-11-76
CHK		2-13-76
ENG		2-18-76
APP		

TITLE CUSTOMER CONNECTION & INTERFACE
GMAD-1, 4CH GMD MUX, 16CH GMM MUX
±10.24V.F.S., GMSH-100, 14B.&S., 2'S COMP.

MAT'L

FINISH

52800-02

NEXT ASSY

A

SIZE

58701-02

SCALE

SH 1 OF 9

PRESTON
SCIENTIFIC INCORPORATED
805 East Cerritos Ave., Anaheim, Calif. 92805
Tel. (714) 776-6400

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
0010				
0020		CUSTOMER CONNECTION & INTERFACE		
0030		GMAD-1, 4 CHANNELS GMD MUX, 16		
0040		CHANNELS GMM MUX WITH EXPANSION		
0050		WIRING TO 128 CHANNEL OF MUX		
0060		+ OR - 10.24 VOLTS FULL SCALE		
0070		GMSH-100, 14 BITS & SIGN		
		TWO'S COMPLEMENT		
0080	2			
0090		CONNECTOR J1 ANALOG INPUTS 00 TO 19		
		MRAC 50S-J6		
0100	1			
0110		MUX 00 HIGH	J1 A	MUX INPUT CHANNEL 00 HIGH
0120		MUX 00 LOW	J1 B	MUX INPUT CHANNEL 00 LOW
0130		MUX 00 SHLD	J1 C	MUX INPUT CHANNEL 00 SHIELD
0140		MUX 01 HIGH	J1 D	MUX INPUT CHANNEL 01 HIGH
0150		MUX 01 LOW	J1 E	MUX INPUT CHANNEL 01 LOW
0160		MUX 01 SHLD	J1 F	MUX INPUT CHANNEL 01 SHIELD
0170		MUX 02 HIGH	J1 H	MUX INPUT CHANNEL 02 HIGH
0180		MUX 02 LOW	J1 J	MUX INPUT CHANNEL 02 LOW
0190		MUX 02 SHLD	J1 K	MUX INPUT CHANNEL 02 SHIELD
0200		MUX 03 HIGH	J1 L	MUX INPUT CHANNEL 03 HIGH
0210		MUX 03 LOW	J1 M	MUX INPUT CHANNEL 03 LOW
0220		MUX 03 SHLD	J1 N	MUX INPUT CHANNEL 03 SHIELD
0230		MUX 04	J1 P	MUX INPUT CHANNEL 04
0240		MUX 04 SHLD	J1 R	MUX INPUT CHANNEL 04 SHIELD
0250		MUX 05	J1 S	MUX INPUT CHANNEL 05
0260		MUX 05 SHLD	J1 T	MUX INPUT CHANNEL 05 SHIELD
0270		MUX 06	J1 U	MUX INPUT CHANNEL 06
0280		MUX 06 SHLD	J1 V	MUX INPUT CHANNEL 06 SHIELD
0290		MUX 07	J1 W	MUX INPUT CHANNEL 07
0300		MUX 07 SHLD	J1 X	MUX INPUT CHANNEL 07 SHIELD
0310		MUX 08	J1 Y	MUX INPUT CHANNEL 08
0320		MUX 08 SHLD	J1 Z	MUX INPUT CHANNEL 08 SHIELD
0330		MUX 09	J1 -A	MUX INPUT CHANNEL 09
0340		MUX 09 SHLD	J1 -B	MUX INPUT CHANNEL 09 SHIELD
0350		MUX 10	J1 -C	MUX INPUT CHANNEL 10
0360		MUX 10 SHLD	J1 -D	MUX INPUT CHANNEL 10 SHIELD
0370		MUX 11	J1 -E	MUX INPUT CHANNEL 11
0380		MUX 11 SHLD	J1 -F	MUX INPUT CHANNEL 11 SHIELD
0390		MUX 12	J1 -H	MUX INPUT CHANNEL 12
0400		MUX 12 SHLD	J1 -J	MUX INPUT CHANNEL 12 SHIELD
0410		MUX 13	J1 -K	MUX INPUT CHANNEL 13
0420		MUX 13 SHLD	J1 -M	MUX INPUT CHANNEL 13 SHIELD
0430		MUX 14	J1 -N	MUX INPUT CHANNEL 14
0440		MUX 14 SHLD	J1 -P	MUX INPUT CHANNEL 14 SHIELD
0450		MUX 15	J1 -R	MUX INPUT CHANNEL 15
0460		MUX 15 SHLD	J1 -S	MUX INPUT CHANNEL 15 SHIELD
0470		MUX 16	J1 -T	MUX INPUT CHANNEL 16
		MUX 16 SHLD	J1 -U	MUX INPUT CHANNEL 16 SHIELD

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
0480				
0490		MUX 17	J1 -V	MUX INPUT CHANNEL 17
0500		MUX 17 SHLD	J1 -W	MUX INPUT CHANNEL 17 SHIELD
0510		MUX 18	J1 -X	MUX INPUT CHANNEL 18
0520		MUX 18 SHLD	J1 -Y	MUX INPUT CHANNEL 18 SHIELD
0530		MUX 19	J1 -Z	MUX INPUT CHANNEL 19
0540		MUX 19 SHLD	J1 AA	MUX INPUT CHANNEL 19 SHIELD
0550		BLANK	J1 BB	NO CONNECTION
0560		BLANK	J1 CC	NO CONNECTION
0570		BLANK	J1 DD	NO CONNECTION
0580		BLANK	J1 EE	NO CONNECTION
0590		ANALOG GRD	J1 FF	ANALOG GROUND
		ANALOG GRD	J1 HH	ANALOG GROUND

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
0600	P			
0610		CONNECTOR J2 DIGITAL ADDRESS & CONTROLS		
		MRAC 75S-J6		
0620	1			
0630		MXAD/FC01	J2 01	MUXAD/FIRST CHAN 01
0640		MXAD/FC01SH	J2 02	MUXAD/FIRST CHAN 01 SHIELD
0650		MXAD/FC02	J2 03	MUXAD/FIRST CHAN 02
0660		MXAD/FC02SH	J2 04	MUXAD/FIRST CHAN 02 SHIELD
0670		MXAD/FC04	J2 05	MUXAD/FIRST CHAN 04
0680		MXAD/FC04SH	J2 07	MUXAD/FIRST CHAN 04 SHIELD
0690		MXAD/FC08	J2 08	MUXAD/FIRST CHAN 08
0700		MXAD/FC08SH	J2 10	MUXAD/FIRST CHAN 08 SHIELD
0710		MXAD/FC16	J2 11	MUXAD/FIRST CHAN 16
0720		MXAD/FC16SH	J2 12	MUXAD/FIRST CHAN 16 SHIELD
0730		MXAD/FC32	J2 13	MUXAD/FIRST CHAN 32
0740		MXAD/FC32SH	J2 14	MUXAD/FIRST CHAN 32 SHIELD
0750		MXAD/FC64	J2 15	MUXAD/FIRST CHAN 64
0760		MXAD/FC64SH	J2 16	MUXAD/FIRST CHAN 64 SHIELD
0770		LASTCH 01	J2 17	LAST CHANNEL 01
0780		LASTCH 01SH	J2 18	LAST CHANNEL 01 SHIELD
0790		LASTCH 02	J2 20	LAST CHANNEL 02
0800		LASTCH 02SH	J2 21	LAST CHANNEL 02 SHIELD
0810		LASTCH 04	J2 22	LAST CHANNEL 04
0820		LASTCH 04SH	J2 23	LAST CHANNEL 04 SHIELD
0830		LASTCH 08	J2 24	LAST CHANNEL 08
0840		LASTCH 08SH	J2,25	LAST CHANNEL 08 SHIELD
0850		LASTCH 16	J2 26	LAST CHANNEL 16
0860		LASTCH 16SH	J2 27	LAST CHANNEL 16 SHIELD
0870		LASTCH 32	J2 28	LAST CHANNEL 32
0880		LASTCH 32SH	J2 29	LAST CHANNEL 32 SHIELD
0890		LASTCH 64	J2 30	LAST CHANNEL 64
0900		LASTCH 64SH	J2 31	LAST CHANNEL 64 SHIELD
0912		EXT ADD	J2 32	EXTERNAL ADDRESS-SEQ*
0920		EXT ADD SH	J2 33	EXTERNAL ADDRESS SHIELD
0930		RESET	J2 34	RESET-GROUND IF NOT USED
0940		RESET SHLD	J2 35	RESET SHIELD
0950		MUX CLK	J2 36	EXTERNAL MUX CLOCK
0960		MUX CLK SH	J2 37	EXTERNAL MUX CLOCK SHIELD
0970		F/LADDCLK	J2 38	FIRST/LAST ADDRESS CLOCK
0980		F/LADDCLKSH	J2 39	FIRST/LAST ADDRESS CLOCK SHIELD
0990		FLREG(FLSW)*	J2 40	FIRST/LAST REGISTER (1ST/LST SW)*
1000		FLRE(FLS)SH	J2 41	FIRST/LAST REGISTER (F/LSW)* SHLD
1010		DTADC	J2 42	DIRECT TRIGGER ADC
1020		DTADC SHLD	J2 43	DIRECT TRIGGER ADC SHIELD
1030		ZERO X	J2 44	ZERO CROSSING
1040		ZERO X SHLD	J2 45	ZERO CROSSING SHIELD
1050		EOC	J2 46	END OF CONVERSION
1060		EOC SHLD	J2 47	END OF CONVERSION SHIELD
1070		CON EOC	J2 48	CON END OF CONVERSION
		CON EOC SH	J2 49	CON END OF CONVERSION SHIELD

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
1080	P			
1090		DMARDY	J2 50	DMARDY
1100		DMARDY SHLD	J2 51	DMARDY SHIELD
1110		INTMUXCLK	J2 52	INTERNAL MUX CLOCK
1120		INTMUXCLKSH	J2 53	INTERNAL MUX CLOCK SHIELD
1130		INT TADC	J2 54	INTERNAL DIRECT TRIGGER ADC
1140		INT TADC SH	J2 55	INTERNAL DIRECT TRIGGER ADC SHLD
1150		DBSIGN +	J2 56	DATA BIT SIGN PLUS
1160		DBSIGN + SH	J2 57	DATA BIT SIGN PLUS SHIELD
1170		DBSIGN -	J2 58	DATA BIT SIGN MINUS
1180		DBSIGN - SH	J2 59	DATA BIT SIGN MINUS SHIELD
1190		ZERO CONT.	J2 60	ZERO CONTROL
1200		ZERO CONT.SH	J2 62	ZERO CONTROL SHIELD
1210		DMARDY *	J2 63	DMA READY COMPLEMENT
1220		DMARDY *SH	J2 64	DMA READY COMPLEMENT SHIELD
1230		BLANK	J2 65	NO CONNECTION
1240		BLANK	J2 66	NO CONNECTION
1250		BLANK	J2 67	NO CONNECTION
1260		BLANK	J2 70	NO CONNECTION
1270		BLANK	J2 71	NO CONNECTION
1280		BLANK	J2 72	NO CONNECTION
1290		EOC *	J2 73	END OF CONVERSION COMPLEMENT
1300		EOC * SHLD	J2 74	END OF CONVERSION COMP. SHIELD
1310		BLANK	J2 75	NO CONNECTION
1320		BLANK	J2 76	NO CONNECTION
1330		COEOC *	J2 77	CON END OF CONVERSION COMPLEMENT
1340		COEOC * SH	J2 78	CON EOC COMPLEMENT SHIELD
1350		BLANK	J2 79	NO CONNECTION
1360		LOGIC GRD	J2 80	LOGIC GROUND
		LOGIC GRD	J2 82	LOGIC GROUND
1370	1			

NOTE * MEANS THE COMPLEMENT

SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
CONNECTOR J3 DIGITAL OUTPUTS & CONTROLS		
MRAC 75S-J6		
DB SIGN +	J3 01 DATA BIT SIGN PLUS	
DB SIGN +SH	J3 08 DATA BIT SIGN PLUS	SHIELD
DB SIGN -	J3 02 DATA BIT SIGN MINUS	
DB SIGN -SH	J3 10 DATA BIT SIGN MINUS	SHIELD
DB 8192	J3 03 DATA BIT 8192	
DB 8192 SH	J3 11 DATA BIT 8192	SHIELD
DB 8192 *	J3 04 DATA BIT 8192	COMPLEMENT
DB 8192 SH*	J3 12 DATA BIT 8192	COMP. SHIELD
DB 4096	J3 05 DATA BIT 4096	
DB 4096 SH	J3 13 DATA BIT 4096	SHIELD
DB 4096 *	J3 07 DATA BIT 4096	COMPLEMENT
DB 4096 SH*	J3 14 DATA BIT 4096	COMP. SHIELD
DB 2048	J3 15 DATA BIT 2048	
DB 2048 SH	J3 22 DATA BIT 2048	SHIELD
DB 2048 *	J3 16 DATA BIT 2048	COMPLEMENT
DB 2048 SH*	J3 23 DATA BIT 2048	COMP. SHIELD
DB 1024	J3 17 DATA BIT 1024	
DB 1024 SH	J3 24 DATA BIT 1024	SHIELD
DB 1024 *	J3 18 DATA BIT 1024	COMPLEMENT
DB 1024 SH*	J3 25 DATA BIT 1024	COMP. SHIELD
DB 512	J3 20 DATA BIT 512	
DB 512 SH	J3 26 DATA BIT 512	SHIELD
DB 512 *	J3 21 DATA BIT 512	COMPLEMENT
DB 512 SH*	J3 27 DATA BIT 512	COMP. SHIELD
DB 256	J3 28 DATA BIT 256	
DB 256 SH	J3 34 DATA BIT 256	SHIELD
DB 256 *	J3 29 DATA BIT 256	COMPLEMENT
DB 256 SH*	J3 35 DATA BIT 256	COMP. SHIELD
DB 128	J3 30 DATA BIT 128	
DB 128 SH	J3 36 DATA BIT 128	SHIELD
DB 128 *	J3 31 DATA BIT 128	COMPLEMENT
DB 128 SH*	J3 37 DATA BIT 128	COMP. SHIELD
DB 64	J3 32 DATA BIT 64	
DB 64 SH	J3 38 DATA BIT 64	SHIELD
DB 64 *	J3 33 DATA BIT 64	COMPLEMENT
DB 64 SH*	J3 39 DATA BIT 64	COMP. SHIELD
DB 32	J3 40 DATA BIT 32	
DB 32 SH	J3 46 DATA BIT 32	SHIELD
DB 32 *	J3 41 DATA BIT 32	COMPLEMENT
DB 32 SH*	J3 47 DATA BIT 32	COMP. SHIELD
DB 16	J3 42 DATA BIT 16	
DB 16 SH	J3 48 DATA BIT 16	SHIELD
DB 16 *	J3 43 DATA BIT 16	COMPLEMENT
DB 16 SH*	J3 49 DATA BIT 16	COMP. SHIELD

SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
DB 08	J3 44 DATA BIT 08	
DB 08 SH	J3 50 DATA BIT 08	SHIELD
DB 08 *	J3 45 DATA BIT 08	COMPLEMENT
DB 08 SH*	J3 51 DATA BIT 08	COMP. SHIELD
DB 04	J3 52 DATA BIT 04	
DB 04 SH	J3 58 DATA BIT 04	SHIELD
DB 04 *	J3 53 DATA BIT 04	COMPLEMENT
DB 04 SH*	J3 59 DATA BIT 04	COMP. SHIELD
DB 02	J3 54 DATA BIT 02	
DB 02 SH	J3 60 DATA BIT 02	SHIELD
DB 02 *	J3 55 DATA BIT 02	COMPLEMENT
DB 02 SH*	J3 62 DATA BIT 02	COMP. SHIELD
DB 01	J3 56 DATA BIT 01	
DB 01 SH	J3 63 DATA BIT 01	SHIELD
DB 01 *	J3 57 DATA BIT 01	COMPLEMENT
DB 01 SH*	J3 64 DATA BIT 01	COMP. SHIELD
CONEOC *	J3 65 CON END OF CONVERSION	COMPLEMENT
CONEOC * SH	J3 73 CON EOC COMPLEMENT	SHIELD
EOC *	J3 66 END OF CONVERSION	COMPLEMENT
EOC * SHLD	J3 74 EOC COMPLEMENT	SHIELD
EOC	J3 67 END OF CONVERSION	
EOC SHLD	J3 75 END OF CONVERSION	SHIELD
CON EOC	J3 70 CON END OF CONVERSION	
CON EOC SH	J3 76 CON END OF CONVERSION	SHIELD
DMARDY	J3 71 DMARDY	
DMARDY SHLD	J3 77 DMARDY	SHIELD
DMARDY *	J3 72 DMARDY	COMPLEMENT
DMARDY * SH	J3 78 DMARDY	COMPLEMENT SHIELD
BLANK	J3 79 NO CONNECTION	
LOGIC GRD	J3 80 LOGIC GROUND	
LOGIC GRD	J3 82 LOGIC GROUND	

SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
CONNECTOR J4 DIGITAL EXPANSION		
MRAC 50S-J6		
MUXAD01*	J4 A MUX ADDRESS 01*	
MUXAD01* SH	J4 B MUX ADDRESS 01*	SHIELD
MUXAD02*	J4 C MUX ADDRESS 02*	
MUXAD02* SH	J4 D MUX ADDRESS 02*	SHIELD
MUXAD04*	J4 E MUX ADDRESS 04*	
MUXAD04* SH	J4 F MUX ADDRESS 04*	SHIELD
FIELD02*	J4 H FIELD ADDRESS 02*	
FIELD02* SH	J4 J FIELD ADDRESS 02*	SHIELD
FIELD03*	J4 K FIELD ADDRESS 03*	
FIELD03* SH	J4 L FIELD ADDRESS 03*	SHIELD
FIELD04*	J4 M FIELD ADDRESS 04*	
FIELD04* SH	J4 N FIELD ADDRESS 04*	SHIELD
FIELD05*	J4 P FIELD ADDRESS 05*	
FIELD05* SH	J4 R FIELD ADDRESS 05*	SHIELD
FIELD06*	J4 S FIELD ADDRESS 06*	
FIELD06* SH	J4 T FIELD ADDRESS 06*	SHIELD
FIELD07*	J4 U FIELD ADDRESS 07*	
FIELD07* SH	J4 V FIELD ADDRESS 07*	SHIELD
FIELD08*	J4 W FIELD ADDRESS 08*	
FIELD08* SH	J4 X FIELD ADDRESS 08*	SHIELD
FIELD09*	J4 Y FIELD ADDRESS 09*	
FIELD09* SH	J4 Z FIELD ADDRESS 09*	SHIELD
FIELD10*	J4 -A FIELD ADDRESS 10*	
FIELD10* SH	J4 -B FIELD ADDRESS 10*	SHIELD
FIELD11*	J4 -C FIELD ADDRESS 11*	
FIELD11* SH	J4 -D FIELD ADDRESS 11*	SHIELD
FIELD12*	J4 -E FIELD ADDRESS 12*	
FIELD12* SH	J4 -F FIELD ADDRESS 12*	SHIELD
FIELD13*	J4 -H FIELD ADDRESS 13*	
FIELD13* SH	J4 -J FIELD ADDRESS 13*	SHIELD
FIELD14*	J4 -K FIELD ADDRESS 14*	
FIELD14* SH	J4 -M FIELD ADDRESS 14*	SHIELD
FIELD15*	J4 -N FIELD ADDRESS 15*	
FIELD15* SH	J4 -P FIELD ADDRESS 15*	SHIELD

SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
BLANK	J4 -R NO CONNECTION	
BLANK	J4 -S NO CONNECTION	
BLANK	J4 -T NO CONNECTION	
BLANK	J4 -U NO CONNECTION	
BLANK	J4 -V NO CONNECTION	
BLANK	J4 -W NO CONNECTION	
BLANK	J4 -X NO CONNECTION	
BLANK	J4 -Y NO CONNECTION	
BLANK	J4 -Z NO CONNECTION	
BLANK	J4 AA NO CONNECTION	
BLANK	J4 BB NO CONNECTION	
BLANK	J4 CC NO CONNECTION	
BLANK	J4 DD NO CONNECTION	
BLANK	J4 EE NO CONNECTION	
LOGIC GRD	J4 FF LOGIC GROUND	
LOGIC GRD	J4 HH LOGIC GROUND	
CONNECTOR J5 ANALOG FROM EXPANSION		
MS3102A-14S-5P		
ANALOG IN	J5 A ANALOG INPUT	
GUARD	J5 B GUARD	
BLANK	J5 C NO CONNECTION	
ANALOG GRD	J5 D ANALOG GROUND	
ANALOG GRD	J5 E ANALOG GROUND	

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	E.O. 5823	11-3-76	

	BY	DATE
DWN		2-11-76
CHK		2-13-76
ENG		2-17-76
APP		

TITLE: WIRE LIST, GMAD-1, 4CH GMM MUX
16 CH GMM MUX WITH EXP. WIRING TO 128CH
±10.24 V.F.S., GMSH-100, 14 B. & S., 2'S COMP.

MAT'L

FINISH

52800-02
NEXT ASSY

A
SIZE

58702-02
SCALE

SH 1 OF 18

PRESTON
SCIENTIFIC INCORPORATED
805 East Cerritos Ave., Anaheim, Calif. 92805
Tel (714) 776-6400

		FROM	TO
10			WIRE LIST, GMAD-1, 4 CHANNELS GMD MUX,
20			16 CHANNELS GMM MUX WITH EXPANSION
30			WIRING TO 128 CHANNELS, + OR - 10.24
40			VOLTS FULL SCALE, GMSH-100, 14 BITS
50			& SIGN, TWO'S COMPLEMENT
60	2		NOTE UNLESS OTHERWISE SPECIFIED
70			ALL WIRE IS TO BE 22 AWG WHITE
80	2		NOTE 01. 18 AWG WHITE
90			NOTE 02. RG 174/U
100			NOTE 03. TWO CONDUCTOR SHIELDED
110			NOTE 04. SWITCH S01 & S03 SEE DWG 52581
120			NOTE 05. 22 AWG BUSS WIRE WITH TEFLON
130			SLEEVING BETWEEN TERMINALS
140			NOTE 06. FOR FRONT PANEL REFERENCE
150			DESIGNATIONS SEE DWG 46112
160			NOTE 07. FOR AC POWER WIRING SEE
170			DWG 58809-00
175	2		CONVERT TWO (2) [redacted] AWG WIRES FROM GRD
176			POST ON REAR CONNECTOR PLATE A01-21.

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		FROM	TO
180	P		CONNECTOR J1 ANALOG INPUTS 00 TO 19
190			MRAC 50S-J6
200	1	MUX 00 HIGH	J1 A MUX 00 HIGH C01 16 NOTE 3 BLK
210		MUX 00 LOW	J1 B MUX 00 LOW C01 12 NOTE 3 WHT
220		MUX 00 SHLD	J1 C MUX 00 SHLD C01 14 NOTE 3 SHLD
230		MUX 01 HIGH	J1 D MUX 01 HIGH C02 16 NOTE 3 BLK
240		MUX 01 LOW	J1 E MUX 01 LOW C02 12 NOTE 3 WHT
250		MUX 01 SHLD	J1 F MUX 01 SHLD C02 14 NOTE 3 SHLD
260		MUX 02 HIGH	J1 H MUX 02 HIGH C03 16 NOTE 3 BLK
270		MUX 02 LOW	J1 J MUX 02 LOW C03 12 NOTE 3 WHT
280		MUX 02 SHLD	J1 K MUX 02 SHLD C03 14 NOTE 3 SHLD
290		MUX 03 HIGH	J1 L MUX 03 HIGH C04 16 NOTE 3 BLK
300		MUX 03 LOW	J1 M MUX 03 LOW C04 12 NOTE 3 WHT
310		MUX 03 SHLD	J1 N MUX 03 SHLD C04 14 NOTE 3 SHLD
320		MUX 04 HIGH	J1 P MUX 04 HIGH C05 16 NOTE 2
330		MUX 04 SHLD	J1 R MUX 04 SHLD C05 14 NOTE 2
340		MUX 05	J1 S MUX 05 C05 12 NOTE 2
350		MUX 05 SHLD	J1 T MUX 05 SHLD C05 10 NOTE 2
360		MUX 06	J1 U MUX 06 C05 08 NOTE 2
370		MUX 06 SHLD	J1 V MUX 06 SHLD C05 06 NOTE 2
380		MUX 07	J1 W MUX 07 C05 04 NOTE 2
390		MUX 07 SHLD	J1 X MUX 07 SHLD C05 02 NOTE 2
400		MUX 08	J1 Y MUX 08 C06 16 NOTE 2
410		MUX 08 SHLD	J1 Z MUX 08 SHLD C06 14 NOTE 2
420		MUX 09	J1 -A MUX 09 C06 12 NOTE 2
430		MUX 09 SHLD	J1 -B MUX 09 SHLD C06 10 NOTE 2
440		MUX 10	J1 -C MUX 10 C06 08 NOTE 2
450		MUX 10 SHLD	J1 -D MUX 10 SHLD C06 06 NOTE 2
460		MUX 11	J1 -E MUX 11 C06 04 NOTE 2
470		MUX 11 SHLD	J1 -F MUX 11 SHLD C06 02 NOTE 2
480		MUX 12	J1 -H MUX 12 C07 16 NOTE 2
490		MUX 12 SHLD	J1 -J MUX 12 SHLD C07 14 NOTE 2
500		MUX 13	J1 -K MUX 13 C07 12 NOTE 2
510		MUX 13 SHLD	J1 -M MUX 13 SHLD C07 10 NOTE 2
520		MUX 14	J1 -N MUX 14 C07 08 NOTE 2
530		MUX 14 SHLD	J1 -P MUX 14 SHLD C07 06 NOTE 2
540		MUX 15	J1 -R MUX 15 C07 04 NOTE 2
550		MUX 15 SHLD	J1 -S MUX 15 SHLD C07 02 NOTE 2
560		MUX 16	J1 -T MUX 16 C08 16 NOTE 2
570		MUX 16 SHLD	J1 -U MUX 16 SHLD C08 14 NOTE 2
580		MUX 17	J1 -V MUX 17 C08 12 NOTE 2
590		MUX 17 SHLD	J1 -W MUX 17 SHLD C08 10 NOTE 2
600		MUX 18	J1 -X MUX 18 C08 08 NOTE 2
610		MUX 18 SHLD	J1 -Y MUX 18 SHLD C08 06 NOTE 2
620		MUX 19	J1 -Z MUX 19 C08 04 NOTE 2
630		MUX 19 SHLD	J1 AA MUX 19 SHLD C08 02 NOTE 2
640		BLANK	J1 BB BLANK
650		BLANK	J1 CC BLANK
660		BLANK	J1 DD BLANK

	FROM	TO
670	BLANK	J1 EE BLANK
680	ANALOG GRD	J1 FF ANALOG GRD C01 18 [redacted]
690	ANALOG GRD	J1 HH ANALOG GRD C01 18 [redacted]

		FROM	TO	
700	P		CONNECTOR J2 DIGITAL ADDRESS & CONTROLS	
710			MRAC 75S-J6	
720	1	MXAD/FC01	J2 01 MXAD/FC01 C11 25 NOTE 2	
730		MXAD/FC01SH	J2 02 MXAD/FC01SH C09 29 NOTE 2	
740		MXAD/FC02	J2 03 MXAD/FC02 C11 26 NOTE 2	
750		MXAD/FC02SH	J2 04 MXAD/FC02SH C09 29 NOTE 2	
760		MXAD/FC04	J2 05 MXAD/FC04 C11 30 NOTE 2	
770		MXAD/FC04SH	J2 07 MXAD/FC04SH C09 29 NOTE 2	
780		MXAD/FC08	J2 08 MXAD/FC08 C11 27 NOTE 2	
790		MXAD/FC08SH	J2 10 MXAD/FC08SH C09 29 NOTE 2	
800		MXAD/FC16	J2 11 MXAD/FC16 C10 25 NOTE 2	
810		MXAD/FC16SH	J2 12 MXAD/FC16SH C09 29 NOTE 2	
820		MXAD/FC32	J2 13 MXAD/FC32 C10 26 NOTE 2	
830		MXAD/FC32SH	J2 14 MXAD/FC32SH C09 29 NOTE 2	
840		MXAD/FC64	J2 15 MXAD/FC64 C10 30 NOTE 2	
850		MXAD/FC64SH	J2 16 MXAD/FC64SH C09 29 NOTE 2	
860		LASTCH 01	J2 17 LASTCH 01 C11 01 NOTE 2	
870		LASTCH 01SH	J2 18 LASTCH 01SH C09 29 NOTE 2	
880		LASTCH 02	J2 20 LASTCH 02 C11 02 NOTE 2	
890		LASTCH 02SH	J2 21 LASTCH 02SH C09 29 NOTE 2	
900		LASTCH 04	J2 22 LASTCH 04 C11 04 NOTE 2	
910		LASTCH 04SH	J2 23 LASTCH 04SH C09 29 NOTE 2	
920		LASTCH 08	J2 24 LASTCH 08 C11 03 NOTE 2	
930		LASTCH 08SH	J2 25 LASTCH 08SH C09 29 NOTE 2	
940		LASTCH 16	J2 26 LASTCH 16 C10 01 NOTE 2	
950		LASTCH 16SH	J2 27 LASTCH 16SH C09 29 NOTE 2	
960		LASTCH 32	J2 28 LASTCH 32 C10 02 NOTE 2	
970		LASTCH 32SH	J2 29 LASTCH 32SH C09 29 NOTE 2	
980		LASTCH 64	J2 30 LASTCH 64 C10 04 NOTE 2	
990		LASTCH 64SH	J2 31 LASTCH 64SH C09 29 NOTE 2	
1000		EXT ADD	J2 32 EXT ADD A19 21 NOTE 2	
1010		EXT ADD SH	J2 33 EXT ADD SH A20 29 NOTE 2	
1020		RESET	J2 34 RESET A19 20 NOTE 2	
1030		RESET SHLD	J2 35 RESET SHLD A20 29 NOTE 2	
1040		MUX CLK	J2 36 MUX CLK A19 22 NOTE 2	
1050		MUX CLK SH	J2 37 MUX CLK SH A20 29 NOTE 2	
1060		F/LADDCLK	J2 38 F/LADDCLK C10 18 NOTE 2	
1070		F/LADDCLKSH	J2 39 F/LADDCLKSH C09 29 NOTE 2	
1080		FLREG(FLSW)*	J2 40 FLREG(FLSW)*C11 13 NOTE 2	
1090		FLRE(FLS)SH*	J2 41 FLRE(FLS)SH*C09 29 NOTE 2	
1100		DTADC	J2 42 DTADC A17 02 NOTE 2	
1110		DTADC SHLD	J2 43 DTADC SHLD A17 38 NOTE 2	
1120		ZERO X	J2 44 ZERO X A03 28 NOTE 2	
1130		ZERO X SHLD	J2 45 ZERO X SHLD A03 26 NOTE 2	
1140		EOC	J2 46 EOC A17 23 NOTE 2 DBL TPR	
1150		EOC SHLD	J2 47 EOC SHLD A17 24 NOTE 2	
1160		CON EOC	J2 48 CON EOC J3 70 NOTE 2	
1170		CON EOC SH	J2 49 CON EOC SH J3 76 NOTE 2	
1180		DMARDY	J2 50 DMARDY J3 71 NOTE 2	

	FROM	TO	
1190	DMARDY SHLD	J2 51	DMARDY SHLD J3 77 NOTE 2
1200	INTMUXCLK	J2 52	INTMUXCLK A19 24 NOTE 2
1210	INTMUXCLKSH	J2 53	INTMUXCLKSH A20 29 NOTE 2
1220	INT TADC	J2 54	INT TADC A17 29 NOTE 2
1230	INT TADC SH	J2 55	INT TADC SH A17 38 NOTE 2
1240	DBSIGN +	J2 56	DBSIGN + A04 28 NOTE 2
1250	DBSIGN + SH	J2 57	DBSIGN + SH A04 26 NOTE 2
1260	DBSIGN -	J2 58	DBSIGN - A03 27 NOTE 2 DBL TPR
1270	DBSIGN - SH	J2 59	DBSIGN - SH A04 26 NOTE 2
1280	ZERO CONT	J2 60	ZERO CONT. A04 27 NOTE 2
1290	ZERO CONT. SH	J2 62	ZERO CONT. SHA04 26 NOTE 2
1300	DMARDY *	J2 63	DMARDY * J3 72 NOTE 2
1310	DMARDY * SH	J2 64	DMARDY * SH J3 78 NOTE 2
1320	BLANK	J2 65	BLANK
1330	BLANK	J2 66	BLANK
1340	BLANK	J2 67	BLANK
1350	BLANK	J2 70	BLANK
1360	BLANK	J2 71	BLANK
1370	BLANK	J2 72	BLANK
1380	EOC *	J2 73	EOC * A19 15 NOTE 2
1390	EOC * SHLD	J2 74	EOC * SHLD A20 29 NOTE 2
1400	BLANK	J2 75	BLANK
1410	BLANK	J2 76	BLANK
1420	CONEOC *	J2 77	CONEOC * J3 65 NOTE 2
1430	CONEOC * SH	J2 78	CONEOC * SH J3 73 NOTE 2
1440	BLANK	J2 79	BLANK
1450	LOGIC GRD	J2 80	LOGIC GRD C09 29 [redacted]
1460	LOGIC GRD	J2 82	LOGIC GRD C09 29 [redacted]

		FROM	TO	
1470	P		CONNECTOR J3 DIGITAL OUTPUTS & CONTROLS	
1480			MRAC 75S-J6	
1490	1	DB SIGN +	J3 01 DB SIGN + A04 28 NOTE 2	
1500		DB SIGN +SH	J3 08 DB SIGN +SH A04 38 NOTE 2	
1510		DB SIGN -	J3 02 DB SIGN - A03 27 NOTE 2 DBL TPR	
1520		DB SIGN -SH	J3 10 DB SIGN -SH A04 38 NOTE 2	
1530		DB 8192	J3 03 DB 8192 A05 28 NOTE 2	
1540		DB 8192 SH	J3 11 DB 8192 SH A05 26 NOTE 2	
1550		DB 8192 *	J3 04 DB 8192 *A05 27 NOTE 2	
1560		DB 8192 SH*	J3 12 DB 8192 SH*A05 26 NOTE 2	
1570		DB 4096	J3 05 DB 4096 A06 28 NOTE 2	
1580		DB 4096 SH	J3 13 DB 4096 SH A06 26 NOTE 2	
1590		DB 4096 *	J3 07 DB 4096 *A06 27 NOTE 2	
1600		DB 4096 SH*	J3 14 DB 4096 SH*A06 26 NOTE 2	
1610		DB 2048	J3 15 DB 2048 A07 28 NOTE 2	
1620		DB 2048 SH	J3 22 DB 2048 SH A07 26 NOTE 2	
1630		DB 2048 *	J3 16 DB 2048 *A07 27 NOTE 2	
1640		DB 2048 SH*	J3 23 DB 2048 SH*A07 26 NOTE 2	
1650		DB 1024	J3 17 DB 1024 A08 28 NOTE 2	
1660		DB 1024 SH	J3 24 DB 1024 SH A08 26 NOTE 2	
1670		DB 1024 *	J3 18 DB 1024 *A08 27 NOTE 2	
1680		DB 1024 SH*	J3 25 DB 1024 SH*A08 26 NOTE 2	
1690		DB 512	J3 20 DB 512 A09 28 NOTE 2	
1700		DB 512 SH	J3 26 DB 512 SH A09 26 NOTE 2	
1710		DB 512 *	J3 21 DB 512 *A09 27 NOTE 2	
1720		DB 512 SH*	J3 27 DB 512 SH*A09 26 NOTE 2	
1730		DB 256	J3 28 DB 256 A10 28 NOTE 2	
1740		DB 256 SH	J3 34 DB 256 SH A10 26 NOTE 2	
1750		DB 256 *	J3 29 DB 256 *A10 27 NOTE 2	
1760		DB 256 SH*	J3 35 DB 256 SH*A10 26 NOTE 2	
1770		DB 128	J3 30 DB 128 A11 28 NOTE 2	
1780		DB 128 SH	J3 36 DB 128 SH A11 26 NOTE 2	
1790		DB 128 *	J3 31 DB 128 *A11 27 NOTE 2	
1800		DB 128 SH*	J3 37 DB 128 SH*A11 26 NOTE 2	
1810		DB 64	J3 32 DB 64 A12 28 NOTE 2	
1820		DB 64 SH	J3 38 DB 64 SH A12 26 NOTE 2	
1830		DB 64 *	J3 33 DB 64 *A12 27 NOTE 2	
1840		DB 64 SH*	J3 39 DB 64 SH*A12 26 NOTE 2	
1850		DB 32	J3 40 DB 32 A13 28 NOTE 2	
1860		DB 32 SH	J3 46 DB 32 SH A13 26 NOTE 2	
1870		DB 32 *	J3 41 DB 32 *A13 27 NOTE 2	
1880		DB 32 SH*	J3 47 DB 32 SH*A13 26 NOTE 2	
1890		DB 16	J3 42 DB 16 A14 28 NOTE 2	
1900		DB 16 SH	J3 48 DB 16 SH A14 26 NOTE 2	
1910		DB 16 *	J3 43 DB 16 *A14 27 NOTE 2	
1920		DB 16 SH*	J3 49 DB 16 SH*A14 26 NOTE 2	
1930		DB 08	J3 44 DB 08 A16 03 NOTE 2	
1940		DB 08 SH	J3 50 DB 08 SH A16 04 NOTE 2	
1950		DB 08 *	J3 45 DB 08 *A16 07 NOTE 2	

	FROM	TO	
1960	DB 08 SH*	J3 51	DB 08 SH*A16 04 NOTE 2
1970	DB 04	J3 52	DB 04 A16 08 NOTE 2
1980	DB 04 SH	J3 58	DB 04 SH A16 09 NOTE 2
1990	DB 04 *	J3 53	DB 04 *A16 12 NOTE 2
2000	DB 04 SH*	J3 59	DB 04 SH*A16 09 NOTE 2
2010	DB 02	J3 54	DB 02 A16 13 NOTE 2
2020	DB 02 SH	J3 60	DB 02 SH A16 14 NOTE 2
2030	DB 02 *	J3 55	DB 02 *A16 17 NOTE 2
2040	DB 02 SH*	J3 62	DB 02 SH*A16 14 NOTE 2
2050	DB 01	J3 56	DB 01 A16 22 NOTE 2
2060	DB 01 SH	J3 63	DB 01 SH A16 20 NOTE 2
2070	DB 01 *	J3 57	DB 01 *A16 18 NOTE 2
2080	DB 01 SH*	J3 64	DB 01 SH*A16 20 NOTE 2
2090	CONEOC *	J3 65	CONEOC * J2 77 NOTE 2
2100	CONEOC * SH	J3 73	CONEOC * SH J2 78 NOTE 2
2110	EOC *	J3 66	EOC * A19 15 NOTE 2
2120	EOC * SHLD	J3 74	EOC * SHLD A20 29 NOTE 2
2130	EOC	J3 67	EOC A17 23 NOTE 2 DBL TPR
2140	EOC SHLD	J3 75	EOC SHLD A17 38 NOTE 2
2150	CON EOC	J3 70	CON EOC J2 48 NOTE 2
2160	CON EOC SH	J3 76	CON EOC SH J2 49 NOTE 2
2170	DMARDY	J3 71	DMARDY J2 50 NOTE 2
2180	DMARDY SHLD	J3 77	DMARDY SHLD J2 51 NOTE 2
2190	DMARDY *	J3 72	DMARDY * J2 63 NOTE 2
2200	DMARDY * SH	J3 78	DMARDY * SH J2 64 NOTE 2
2210	BLANK	J3 79	BLANK
2220	LOGIC GRD	J3 80	LOGIC GRD A01 37 [redacted]
2230	LOGIC GRD	J3 82	LOGIC GRD A01 37 [redacted]

		FROM			TO		
2240	P	CONNECTOR J4 DIGITAL EXPANSION					
2250		MRAC 50S-J6					
2260	1	MUXAD01*	J4	A	MUXAD01*	A18 21	NOTE 2
2270		MUXAD01* SH	J4	B	MUXAD01* SH	A20 29	NOTE 2
2280		MUXAD02*	J4	C	MUXAD02*	A18 23	NOTE 2
2290		MUXAD02* SH	J4	D	MUXAD02* SH	A20 29	NOTE 2
2300		MUXAD04*	J4	E	MUXAD04*	A18 26	NOTE 2
2310		MUXAD04* SH	J4	F	MUXAD04* SH	A20 29	NOTE 2
2320		FIELD02*	J4	H	FIELD02*	C08 34	NOTE 2
2330		FIELD02* SH	J4	J	FIELD02* SH	C09 29	NOTE 2
2340		FIELD03*	J4	K	FIELD03*	A18 13	NOTE 2
2350		FIELD03* SH	J4	L	FIELD03* SH	A20 29	NOTE 2
2360		FIELD04*	J4	M	FIELD04*	A18 12	NOTE 2
2370		FIELD04* SH	J4	N	FIELD04* SH	A20 29	NOTE 2
2380		FIELD05*	J4	P	FIELD05*	A18 11	NOTE 2
2390		FIELD05* SH	J4	R	FIELD05* SH	A20 29	NOTE 2
2400		FIELD06*	J4	S	FIELD06*	A18 10	NOTE 2
2410		FIELD06* SH	J4	T	FIELD06* SH	A20 29	NOTE 2
2420		FIELD07*	J4	U	FIELD07*	A18 09	NOTE 2
2430		FIELD07* SH	J4	V	FIELD07* SH	A20 29	NOTE 2
2440		FIELD08*	J4	W	FIELD08*	A18 08	NOTE 2
2450		FIELD08* SH	J4	X	FIELD08* SH	A20 29	NOTE 2
2460		FIELD09*	J4	Y	FIELD09*	A18 07	NOTE 2
2470		FIELD09* SH	J4	Z	FIELD09* SH	A20 29	NOTE 2
2480		FIELD10*	J4	-A	FIELD10*	A18 06	NOTE 2
2490		FIELD10* SH	J4	-B	FIELD10* SH	A20 29	NOTE 2
2500		FIELD11*	J4	-C	FIELD11*	A18 05	NOTE 2
2510		FIELD11* SH	J4	-D	FIELD11* SH	A20 29	NOTE 2
2520		FIELD12*	J4	-E	FIELD12*	A18 04	NOTE 2
2530		FIELD12* SH	J4	-F	FIELD12* SH	A20 29	NOTE 2
2540		FIELD13*	J4	-H	FIELD13*	A18 03	NOTE 2
2550		FIELD13* SH	J4	-J	FIELD13* SH	A20 29	NOTE 2
2560		FIELD14*	J4	-K	FIELD14*	A18 02	NOTE 2
2570		FIELD14* SH	J4	-M	FIELD14* SH	A20 29	NOTE 2
2580		FIELD15*	J4	-N	FIELD15*	A18 01	NOTE 2
2590		FIELD15* SH	J4	-P	FIELD15* SH	A20 29	NOTE 2
2600		BLANK	J4	-R	BLANK		
2610		BLANK	J4	-S	BLANK		
2620		BLANK	J4	-T	BLANK		
2630		BLANK	J4	-U	BLANK		
2640		BLANK	J4	-V	BLANK		
2650		BLANK	J4	-W	BLANK		
2660		BLANK	J4	-X	BLANK		
2670		BLANK	J4	-Y	BLANK		
2680		BLANK	J4	-Z	BLANK		
2690		BLANK	J4	AA	BLANK		
2700		BLANK	J4	BB	BLANK		
2710		BLANK	J4	CC	BLANK		
2720		BLANK	J4	DD	BLANK		

		FROM			TO		
2730		BLANK	J4	EE	BLANK		
2740		LOGIC GRD	J4	FF	LOGIC GRD	A01 37	[illegible]
2750		LOGIC GRD	J4	HH	LOGIC GRD	A01 37	[illegible]

		FROM			TO		
2760	P	CONNECTOR J5 ANALOG FROM EXPANSION					
2770		MS3102A-14S-5P					
2780	1	ANALOG IN	J5	A	ANALOG IN	C01 22	NOTE 2
2790		GUARD	J5	B	GUARD	C01 21	NOTE 2
2800		BLANK	J5	C	BLANK		
2810		ANALOG GRD	J5	D	ANALOG GRD	J5 E	JUMPER
2820		ANALOG GRD	J5	E	ANALOG GRD	C01 30	[illegible]
2830	2	ADC FRONT PANEL WIRING					
2840		SEE NOTES 4 & 6					
2850	1	SWITCH S01 WIRING					
2860	1	NORM MODE *	S01	A1	EXT. MODE	A17 01	
2870		INT. MODE *	S01	A2	INT. MODE	A17 03	
2880		MAN. MODE *	S01	A3	MAN. MODE	A17 04	
2890		SW WPR	S01	A6	GROUND	A17 38	
2900	2	SWITCH S02 WIRING					
2910	1	MAN PB	S02	C	GROUND	A20 29	
2920		MAN PB	S02	NO	MAN PB MODE	A17 06	
2930		MAN PB	S02	NC	MAN PB MODE	A17 05	
2940	2	R01 WIRING					
2950	1	ADC ZERO	R01	CW	+10V REF	A01 18	
2960		ADC ZERO	R01	CCW	-10V REF	A01 16	
2970		ADC ZERO	R01	C	S&H ZERO	A02 05	

		FROM			TO		
2980	P	LAMP DRIVER BOARD ONE (1) WIRING					
2990	1	+ SIGN	LD1	01	+ SIGN	A03 35	
3000		- SIGN	LD1	04	- SIGN	A03 32	
3010		8192	LD1	07	8192	A05 35	
3020		4096	LD1	10	4096	A06 35	
3030		2048	LD1	13	2048	A07 35	
3040		1024	LD1	16	1024	A08 35	
3050		512	LD1	19	512	A09 35	
3060		256	LD1	22	256	A10 35	
3070		128	LD1	25	128	A11 35	
3080		64	LD1	28	64	A12 35	
3090		32	LD1	31	32	A13 35	
3100		16	LD1	34	16	A14 35	
3110		08	LD1	37	08	A16 06	
3120		04	LD1	40	04	A16 11	
3130		02	LD1	43	02	A16 16	
3140		01	LD1	46	01	A16 21	
3150		PWRGRD	LD1	50	PWRGRD	C12 11	
3160		+10V	LD1	51	+10V	C12 09	
3170	2	LAMP DRIVER BOARD TWO (2) WIRING					
3180	1	MALD 64	LD2	28	MADD 64*	A18 32	
3190		MALD 32	LD2	31	MADD 32*	A18 33	
3200		MALD 16	LD2	34	MADD 16*	A18 34	
3210		MALD 08	LD2	37	MADD 08*	A20 35	
3220		MALD 04	LD2	40	MADD 04*	A18 36	
3230		MALD 02	LD2	43	MADD 02*	A20 37	
3240		MALD 01	LD2	46	MADD 01*	A18 38	
3250		PWRGRD	LD2	50	PWRGRD	C12 11	
3260		+10V	LD2	51	+10V	C12 09	

		FROM	TO	
3270	P	MULTIPLEXER FRONT PANEL WIRING		
3280	1	SWTICH S03 WIRING		
3290	1	MDSW NORM *	S03 A1 NORM	A19 04
3300		MDSW MRAN *	S03 A2 MRAN	A19 05
3310		MDSW CRAN *	S03 A3 CRAN	A19 06
3320		MDSW MSEQ *	S03 A4 MSEQ	A19 07
3330		MDSW CSEQ *	S03 A5 CSEQ	A19 08
3340		MDSW WPR	S03 A6 GROUND	A17 38
3350	2	SWITCH S04 WIRING		
3360	1	MAN PB	S04 NC PB NC	A19 01
3370		MAN PB	S04 NO PB NC	A19 02
3380		MAN PB	S04 C GROUND	S03 A6
3390	2	TEST POINT WIRING		
3400	1	JUMPER SHIELDS TOGETHER ON FRONT PANEL		
3410		END OF THE BELOW WIRES & TIE TO TP6		
3420	1	EXAD	TP1 EXAD	A19 21 NOTE 2
3430		CLOCK	TP2 CLOCK	A19 24 NOTE 2
3440		TADC	TP3 TADC	A17 09 NOTE 2
3450		BUSY	TP4 BUSY	A17 12 NOTE 2
3460		COIN	TP5 COIN	A19 31 NOTE 2
3470		GROUND	TP6 GROUND	C09 29 [redacted]

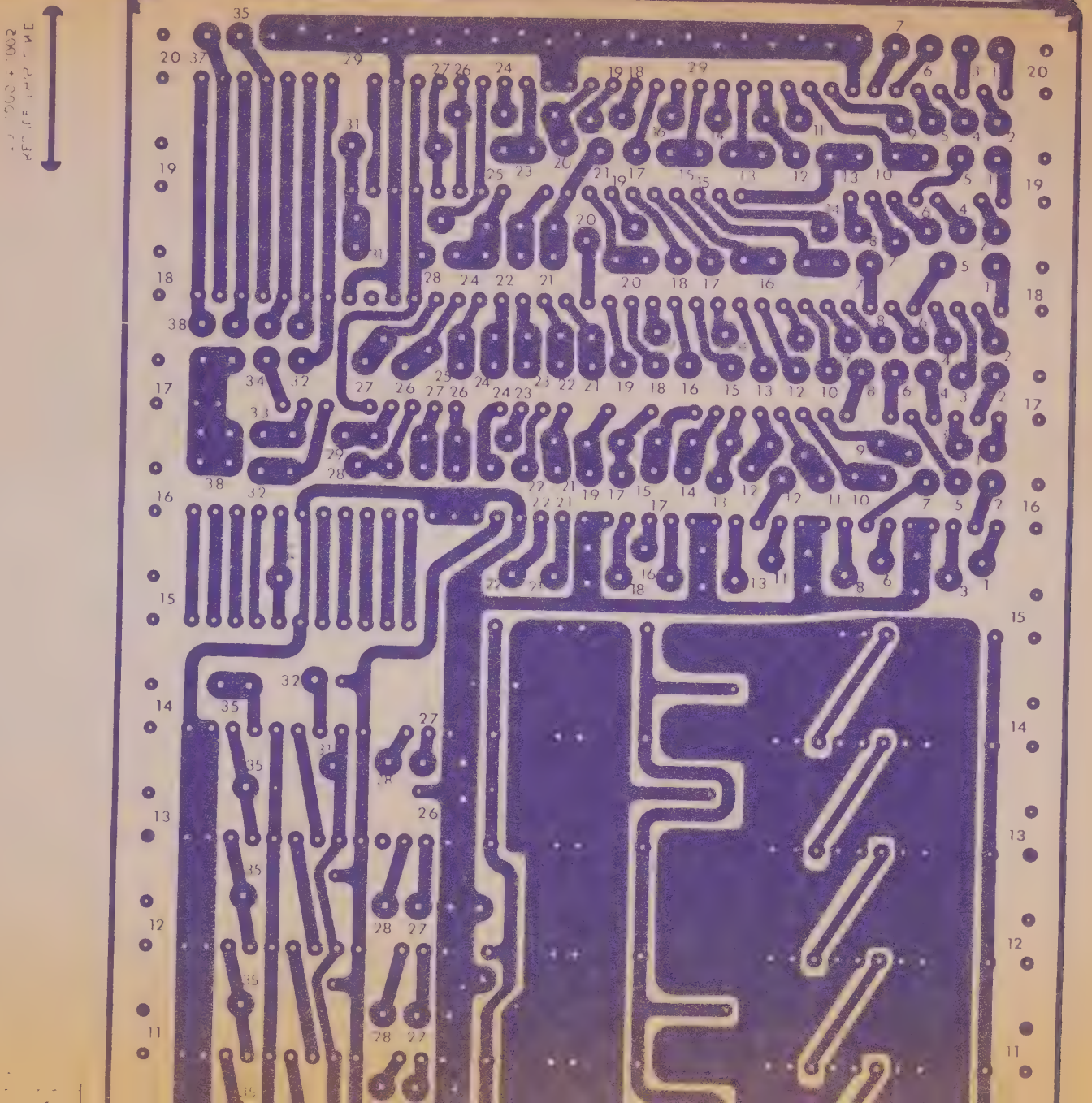
		FROM	TO	
3480	P	MUX ANALOG SWITCH WIRING		
3490	1	FIRST MUX SWITCH WIRING		
3500	1	FMASW 64	S14 C1 SW 64	C10 38
3510		FMASW 32	S15 C1 SW 32	C10 33
3520		FMASW 16	S16 C1 SW 16	C10 31
3530		FMASW 08	S17 C1 SW 08	C11 37
3540		FMASW 04	S18 C1 SW 04	C11 38
3550		FMASW 02	S19 C1 SW 02	C11 33
3560		FMASW 01	S20 C1 SW 01	C11 31
3570	1	FMASW 64	S14 A1 GRD	S15 A1 JUMPER
3580		FMASW 32	S15 A1 GRD	S16 A1 JUMPER
3590		FMASW 16	S16 A1 GRD	S17 A1 JUMPER
3600		FMASW 08	S17 A1 GRD	S18 A1 JUMPER
3610		FMASW 04	S18 A1 GRD	S19 A1 JUMPER
3620		FMASW 02	S19 A1 GRD	S20 A1 JUMPER
3630		FMASW 01	S20 A1 GRD	C09 29
3640	2	LAST MUX SWITCH WIRING		
3650	1	LMASW 64	S06 A1 SW 64	C10 12
3660		LMASW 32	S07 A1 SW 32	C10 07
3670		LMASW 16	S08 A1 SW 16	C10 05
3680		LMASW 08	S09 A1 SW 08	C11 11
3690		LMASW 04	S10 A1 SW 04	C11 12
3700		LMASW 02	S11 A1 SW 02	C11 07
3710		LMASW 01	S12 A1 SW 01	C11 05
3720	1	LMASW 64	S06 C1 GRD	S07 C1 JUMPER
3730		LMASW 32	S07 C1 GRD	S08 C1 JUMPER
3740		LMASW 16	S08 C1 GRD	S09 C1 JUMPER
3750		LMASW 08	S09 C1 GRD	S10 C1 JUMPER
3760		LMASW 04	S10 C1 GRD	S11 C1 JUMPER
3770		LMASW 02	S11 C1 GRD	S12 C1 JUMPER
3780		LMASW 01	S12 C1 GRD	C09 29

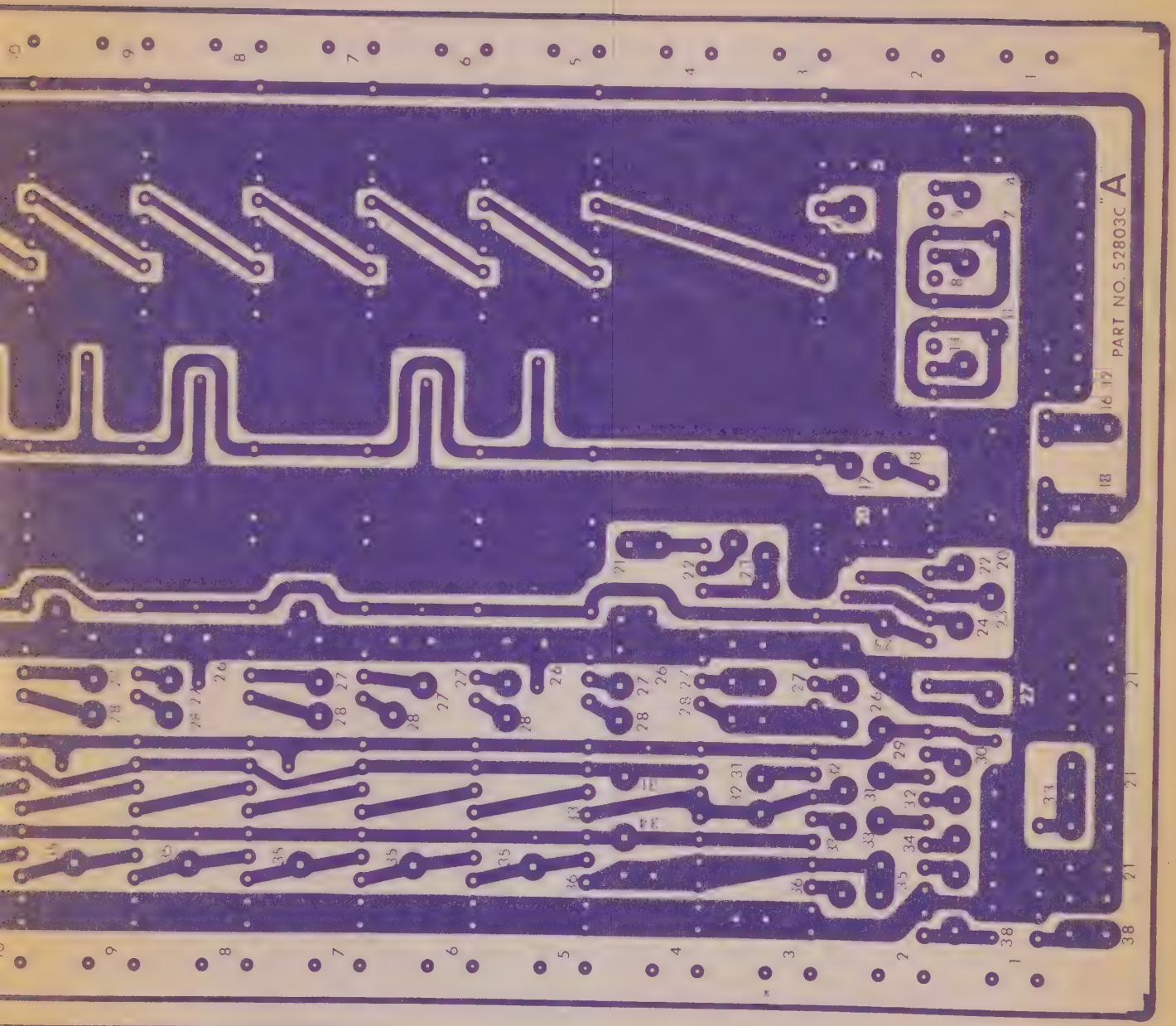
		FROM	TO	
3790	P	MUX OUTPUT WIRING		
3800		SEE NOTE 5		
3810	1	STRAP THE BIFURCATED TERMINALS TOGETHER		
3820	1	STRAP PINS 22 TOGETHER		
3830	1		C01 22	
3840			C02 22	
3850			C03 22	
3860			C04 22	
3870			C05 22	
3880			C06 22	
3890			C07 22	
3900			C08 22	
3910			C09 22	
3920	1	MUX OUTPUT	C01 22 S&H IN	A02 13 NOTE 2
3930		MUX GUARD	C01 21 S&H IN GD	A02 11 NOTE 2
3940	2	MUX DECODE LOGIC WIRING		
3950	1	DECODE 1*	C01 38 DECODE 1*	A18 22
3960		DECODE 1	C01 37 DECODE 1	A18 18
3970		DECODE 2*	C01 36 DECODE 2*	A18 24
3980		DECODE 2	C01 35 DECODE 2	A18 20
3990		DECODE 4*	C01 34 DECODE 4*	A18 26
4000		DECODE 4	C05 36 DECODE 4	A18 25
4010		DECODE 1*	A18 21 DECODE 1*	A18 17
4020		DECODE 2*	A18 23 DECODE 2*	A18 19
4030		FIELD 0	C04 32 FIELD 0	A04 22
4040		FIELD 0*	C05 34 FIELD 0*	A04 21
4050		FIELD 1*	C07 34 FIELD 1*	A18 15
4060		FIELD 2*	C08 34 FIELD 2*	A18 14
4070		FIELD 0*	A04 21 FIELD 0*	A18 16
4080		MUXAD 64	C10 30 MUXAD 64	A20 23
4090		MUXAD 32	C10 26 MUXAD 32	A20 20
4100		MUXAD 16	C10 25 MUXAD 16	A20 18
4110		MUXAD 08	C11 27 MUXAD 08	A20 13
4120		MUXAD 04	C11 30 MUXAD 04	A20 15
4130		MUXAD 02	C11 26 MUXAD 02	A20 12
4140		MUXAD 01	C11 25 MUXAD 01	A20 10
4150		FCHAN 64	C10 35 FCHAN 64	A20 24
4160		FCHAN 32	C10 34 FCHAN 32	A20 19
4170		FCHAN 16	C10 32 FCHAN 16	A20 17
4180		FCHAN 08	C11 36 FCHAN 08	A20 14
4190		FCHAN 04	C11 35 FCHAN 04	A20 16
4200		FCHAN 02	C11 34 FCHAN 02	A20 11
4210		FCHAN 01	C11 32 FCHAN 01	A20 09

	FROM	TO	
4220	LCHAN 64	C10 09 LCHAN 64	A20 07
4230	LCHAN 32	C10 08 LCHAN 32	A20 06
4240	LCHAN 16	C10 06 LCHAN 16	A20 05
4250	LCHAN 08	C11 10 LCHAN 08	A20 04
4260	LCHAN 04	C11 09 LCHAN 04	A20 03
4270	LCHAN 02	C11 08 LCHAN 02	A20 02
4280	LCHAN 01	C11 06 LCHAN 01	A20 01
4290	NORM 1	A17 08 INV 1-1	A17 32
4300	NORM 2	A19 13 INV 1-2	A17 33
4310	NORM *	A17 34 INV 2-1	A17 26
4320	INV 2-1	A17 26 INV 2-2	A17 27
4330	BRST	A17 14 BRST	A17 15
4340	BRST	A17 15 INT-EOC	A17 22
4350	BSET	A17 10 GATE 1	A17 19
4360	BSET	A17 11 NORM	A17 28
4370	INHIBIT	A18 27 ~~GND~~ GRD	~~A19 04~~ A20 29
4375	EOC	A19 14 EOC	A17 15 DBL TPR PIN

		FROM			TO		
4380	P	ADC LOGIC WIRING					
4390	1	S&H OUT	A02	22	DBIN	A03	06 NOTE 2
4400		S&H GRD	A02	20	DBIN SHLD	A03	07 NOTE 2
4410		S&H LO	A02	08	GRD	A02	04
4420		S&H LO GD	A02	07	GRD	A02	04
4430		BIAS	A04	23	GATE	A03	31
4440		+ REF	A01	18	+10 REF	A02	23
4450		- REF	A01	16	-10 REF	A02	24
4460		ADC GATE 1	A05	31	DELAY 1	A17	19
4470		ADC GATE 2	A15	34	DELAY 2	A17	21
4480		HOLD	A17	17	HOLD	A02	31
4490		SAMPLE	A17	21	SAMPLE	A02	33
4500		B'R*	A03	33	GRD	A02	37
4510		BR1 *	A14	32	B'R*	A16	01
4520		BR1	A14	35	B'R	A16	02
4530		NORM A	C11	14	NORM	A19	13
4540		LC&FC GATE	C10	20	GRD	C09	29
4550		STORAGE	A02	34	STORAGE	A02	35

		FROM			TO		
4560	P	POWER SUPPLY & GROUND WIRING					
4570	1	+10V	C05	28	+10V	C12	09
4580		+10V	A02	29	+10V	C12	09
4590		+10V	A18	28	+10V	C12	09
4600		-10V	A02	38	-10V	C12	04
4610		-10V	A05	34	-10V	C12	04
4620		+32V	C01	26	+32V	C12	12
4630		+32V	A01	38	+32V	C12	12
4635		+32V	A01	38	+32V	A02	25
4640		-32V	C01	27	-32V	C12	13
4650		-32V	A01	33	-32V	C12	13
4655		-32V	A01	33	-32V	A02	27
4656		-32V	A01	33	-32V	A03	17
4660		GROUND	C01	25	GROUND	C1211B	
4670		GROUND	C01	25	GROUND	A01	21
4680		GROUND	C01	30	GROUND	C01	10
4690		GROUND	C01	30	GROUND	C01	10
4700		GROUND	C09	29	GROUND	C0929A	JUMPER
4710		GROUND	C09	29	GROUND	C0929A	JUMPER
4720		GROUND	A01	21	GROUND	C1211A	
4760		GROUND	C09	29	GROUND	C1211C	
4770		GROUND	C09	29	GROUND	C1211C	
4780		GROUND	A17	38	GROUND	C1211C	
4790		GROUND	A20	29	GROUND	C1211C	
4800		GROUND	A02	37	GROUND	C1211B	
4810		GROUND	A02	37	GROUND	C1211B	
4820		GROUND	C01	02	GROUND	C1211A	
4830		GROUND	C01	02	GROUND	C1211A	
4840		GROUND	A01	12	GROUND	C1211A	
4850		GROUND	A01	12	GROUND	C1211A	
4860		GROUND	C01	29	GROUND	C09	29
4870		GROUND	C02	29	GROUND	C09	29





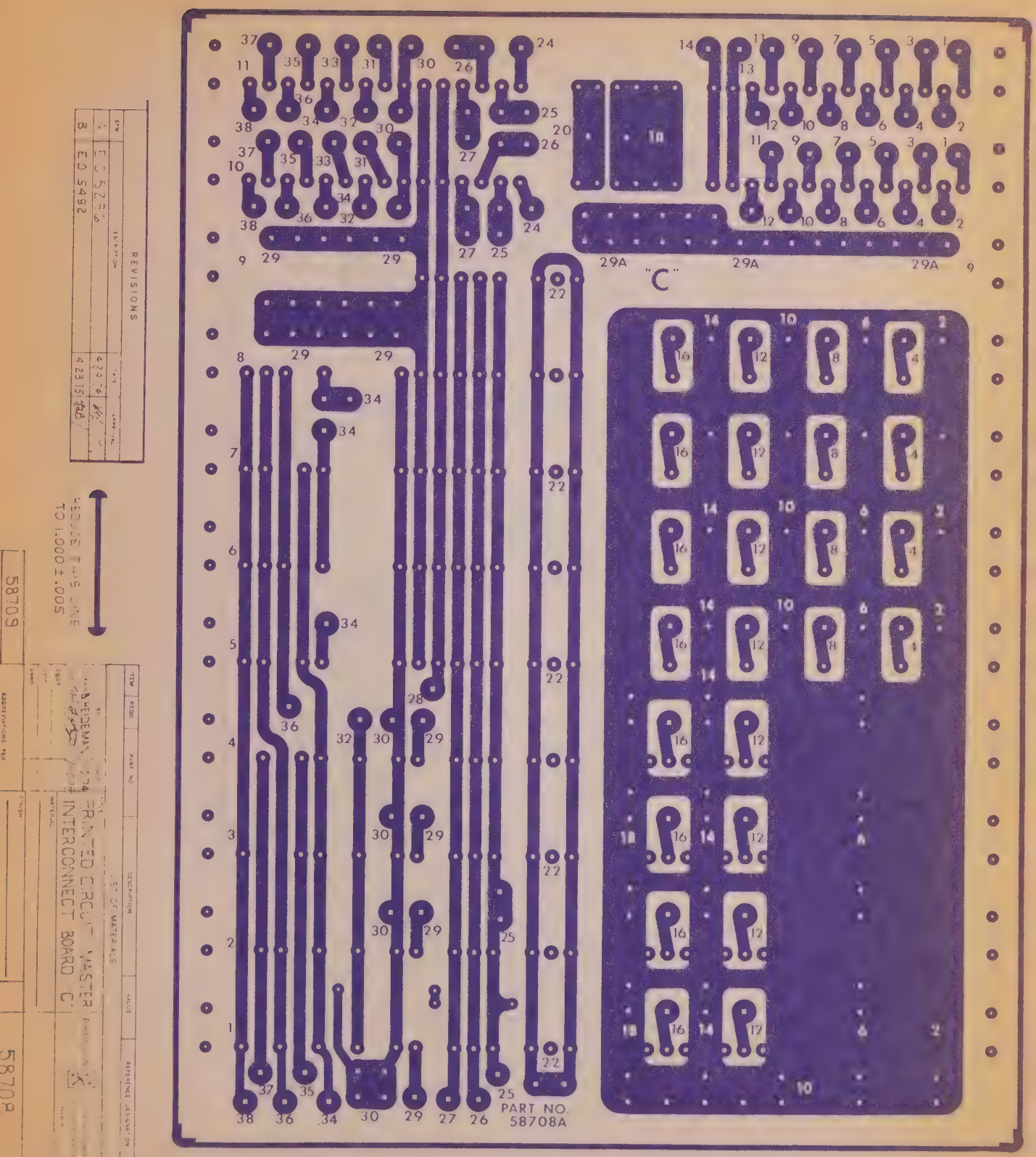
REVISIONS

PRINTED CIRCUIT MASTER
INTERCONNECT BOARD "A"

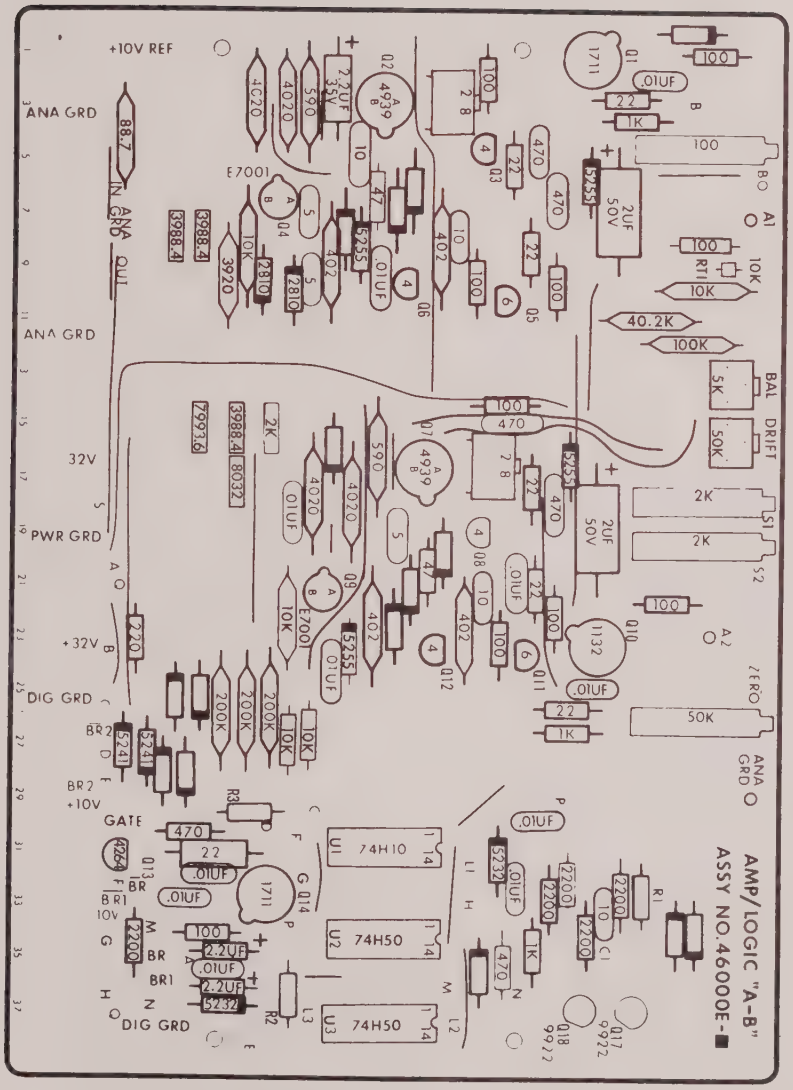
52804

52803

2/1



"C"
PART NO.
58708A
REVISIONS
B ED 5482
REDUCE THIS LINE
TO 1.000 ± .005
58709
PRINTED CIRCUIT MASTER
INTERCONNECT BOARD "C"
58708



PRINTED CIRCUIT ASSY
AMPLIFIER LOGIC "A-B"

M.J.Stern 4-1-74
B.HEIDEMAN 4-2-74

PRESTON

46000-T

2:1

ABBREVIATIONS PER MIL STD 12

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHEET ONE		

TABULATION			
DASH NO	WIRE FROM	WIRE TO	R2 & R3
46000-00	L1	L3	33Ω
46000-01	L1	L2	33Ω
46000-02	L1	L3	JUMPER

8. FOR R2, R3, L1, L2 & L3 WIRING SEE TABULATION.
7. C1 HAS NOMINAL VALUE SHOWN. SELECT ACTUAL VALUE IN TEST.
6. WIRE FROM POINT TO POINT 'A' TO 'A' ETC.
5. R1 TO BE SELECTED IN TEST.
4. ALL CAPACITOR VALUES ARE IN PF.
3. ALL DIODES ARE IN4148.
2. FOR LIST OF MATERIALS SEE SH. 3 & 4 OF 4.
1. FOR SCHEMATIC DIAGRAM SEE DWG NO. 46001-T.

NOTE: UNLESS OTHERWISE SPECIFIED

BY	DATE
DWN M. J. Stern	4-1-74
CHK B. HEIDEMAN	4.2.74
ENG D. Hyman	4.2.74
APP	

TITLE: PRINTED CIRCUIT ASSY AMPLIFIER LOGIC 'A-B'

MAT'L

FINISH

NEXT ASSY

PRESTON SCIENTIFIC INCORPORATED
803 East Cerritos Ave Anaheim Calif 92801
Tel (714) 776-6400

A SIZE | 46000-T | SCALE | SH 2 OF 4

TITLE: P.C. ASSY AMP/LOGIC A-B
DWG NO. 46000-00 REV A
SHEET 3 OF 4

PRESTON SCIENTIFIC INC.
PRINTED 03/01/77

PARTS LIST

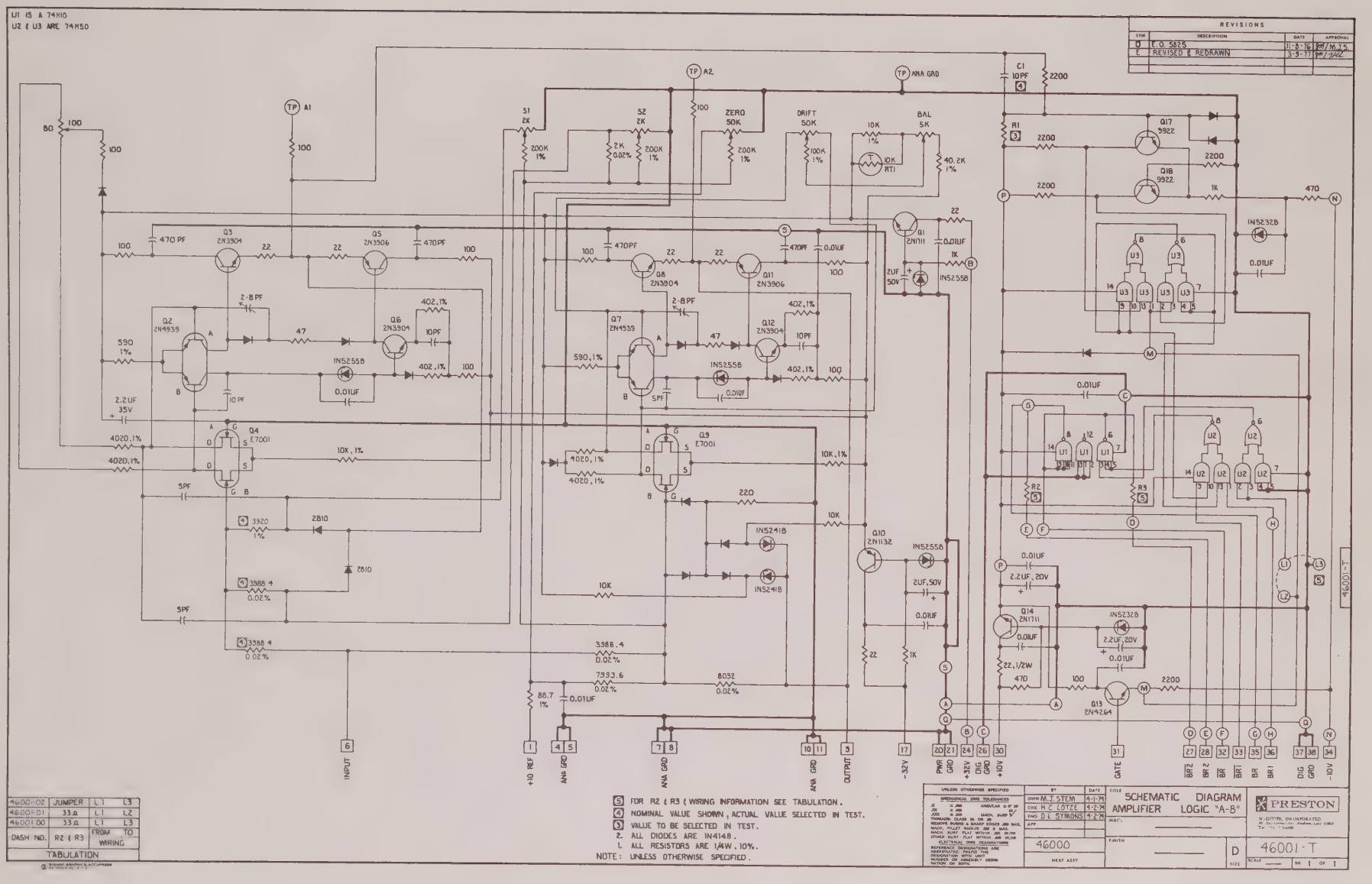
ITEM	QTY	PART NO.	DESCRIPTION	
10	1	46003-00	D&R ASSY AMP/LOGIC A-B	C
40	6	521-00	RESISTOR 1/4W 10% 22	
45	2	522-00	RESISTOR 1/4W 10% 33	
50	2	523-00	RESISTOR 1/4W 10% 47	
60	10	525-00	RESISTOR 1/4W 10% 100	
70	1	527-00	RESISTOR 1/4W 10% 220	
80	2	529-00	RESISTOR 1/4W 10% 470	
90	3	531-00	RESISTOR 1/4W 10% 1K	
100	5	533-00	RESISTOR 1/4W 10% 2200	
120	2	538-00	RESISTOR 1/4W 10% 10K	
140	1	395-13	RESISTOR 1/4W 1% 88.7	
150	4	401-04	RESISTOR 1/4W 1% 402	
160	2	405-00	RESISTOR 1/4W 1% 590	
165	1	439-02	RESISTOR 1/4W 1% 3920	
170	4	440-00	RESISTOR 1/4W 1% 4020	
180	3	456-03	RESISTOR 1/4W 1% 10K	
185	1	471-03	RESISTOR 1/4W 1% 40.2K	
187	1	478-00	RESISTOR 1/4W 1% 100K	
190	3	479-00	RESISTOR 1/4W 1% 200K	
200	1	561-00	RESISTOR 1/2W 10% 22	
210	1	998-22	RESISTOR .02% 2K	
220	3	998-25	RESISTOR .02% 3988.4	
240	1	998-46	RESISTOR .02% 7993.6	
250	1	999-71	RESISTOR .02% 8032	
255	1	374-05	THERMISTOR 10K	
260	1	342-01	POTENTIOMETER 100	
270	2	347-01	POTENTIOMETER 2K	
275	1	351-80	POTENTIOMETER 5K	
277	1	369-02	POTENTIOMETER 50K	
280	1	372-03	POTENTIOMETER 50K	
290	2	79-01	CAPACITOR TRIMMER 2-8PF	
310	4	50-01	CAPACITOR 5PF	
320	4	52-01	CAPACITOR 5% 10PF	
350	4	72-01	CAPACITOR 10% 470PF	
360	11	93-01	CAPACITOR 10% .01UF	
370	2	116-00	CAPACITOR 2UF 50V	
380	2	131-00	CAPACITOR 20% 2.2UF 20V	
385	1	133-00	CAPACITOR 20% 2.2UF 35V	
390	15	239-00	DIODE 1N4148	
400	2	248-13	DIODE ZENER 1N5241B	
410	2	244-08	DIODE ZENER 1N5232B	
420	4	247-20	DIODE ZENER 1N5255B	
425	2	248-22	DIODE 5082-2810	
430	1	824-00	TRANSISTOR 2N1132	
440	2	828-00	TRANSISTOR 2N1711	
460	4	846-00	TRANSISTOR 2N3904	
470	2	846-01	TRANSISTOR 2N3906	
480	2	846-08	TRANSISTOR 2N4939	
485	2	9922-00	TRANSISTOR SELECT	A
490	2	845-10	TRANSISTOR E7001	

TITLE: P.C ASSY AMP/LOGIC A-B
DWG NO. 46000-00 REV A
SHEET 4 OF 4

PRESTON SCIENTIFIC INC.
PRINTED 03/01/77

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
500	1	842-01	TRANSISTOR	2N4264
510	2	848-24	INTEGRATED CIRCUIT	74H50
520	1	848-48	INTEGRATED CIRCUIT	74H10



DASH NO.	R2 & R3	FROM	TO
46001-02	JUMPER	L1	L3
46001-01	33Ω	L1	L2
46001.00	33Ω	L1	L3

TABULATION

5 FOR R2 & R3 & WIRING INFORMATION SEE TABULATION.
4 NOMINAL VALUE SHOWN, ACTUAL VALUE SELECTED IN TEST.
3 VALUE TO BE SELECTED IN TEST.
2. ALL DIODES ARE 1N4148.
1. ALL RESISTORS ARE 1/4W, 10%.
NOTE: UNLESS OTHERWISE SPECIFIED.

UNLESS OTHERWISE SPECIFIED
DIMENSIONAL DWG TOLERANCES
.X ± .005 ANGULAR ± 0° 30'
.XX ± .005 ±0°
.XXX ± .005 MACH. SURF
THREADS: CLASS 3A OR 3B
REMOVE BURRS & SHARP EDGES .005 MAX.
MACH. FILLET RADIUS .005 & MAX.
MACH. SURF FLAT WITHIN .005 ON/IN
OTHER SURF FLAT WITHIN .005 ON/IN
ELECTRICAL DWG DESIGNATIONS
REFERENCE DESIGNATIONS ARE ABBREVIATED PREFIX THE DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.

	BY	DATE
DWN	M.J. STEM	4-1-74
CHK	H.C. LOTZE	4-2-74
ENG	D.L. SYMONS	4-2-74
APP		

46000
NEXT ASSY

TITLE SCHEMATIC DIAGRAM AMPLIFIER LOGIC "A-B"

MAT'L

FINISH

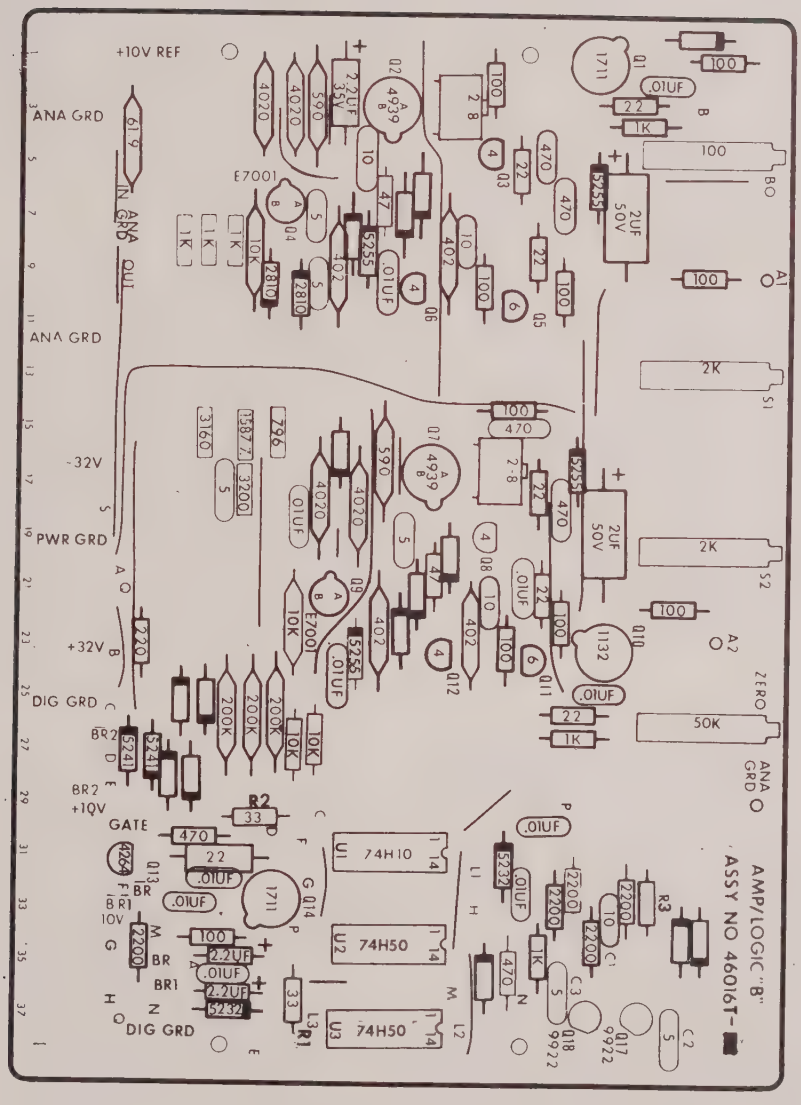
D SIZE

46001-T

SCALE

SH 1 OF 1

PRESTON
SCIENTIFIC INCORPORATED



DRAWN A. FARLAND	DATE 11-21-69	TITLE PRINTED CIRCUIT ASSY AMP/LOGIC "B"	
CHK D SYMONS	11-22-69		
ENGR		MATERIAL	
APPD		FINISH	46016-T
APPD		SCALE 2/1	48 25 NEXT ASSY

ABBREVIATIONS PER MIL STD-12

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

TABULATION			
DASH NO.	WIRE FROM	WIRE TO	R1 & R2 VALUE
46016-00	L1	L3	33Ω
46016-01	L1	L2	33Ω
46016-02	L1	L3	STRAP

8. C1-C3 NOMINAL VALUE SHOWN. SELECT ACTUAL VALUES IN TEST.
7. FOR R1 & R2 WIRING L1, L2 & L3 SEE TABULATION.
6. WIRE FROM POINT TO POINT. A TO A ETC.
5. RB TO BE SELECTED IN TEST.
4. ALL CAPACITOR VALUES ARE IN PF.
3. ALL DIODES ARE IN9148.
2. FOR LIST OF MATERIALS SEE SH. 3 OF 3.
1. FOR SCHEMATIC DIAGRAM SEE DWG 46017-T

NOTES: UNLESS OTHERWISE SPECIFIED

BY	DATE
DRAWN A. FARLAND	11-26-69
CHK D. L. SYMONS	11-22-69
ENGR D. L. SYMONS	12-30-70
APPD	
APPD	

TITLE: PRINTED CIRCUIT ASSY AMP/LOGIC "B"

MATERIAL

FINISH

SCALE

SIZE A

CODE

SH 2 OF 3

PRESTON

SCIENTIFIC INCORPORATED
805 East Cerritos Ave., Anaheim, Calif. 92803
Tel. (714) 776-6400

48125

NEXT ASSY

46016-T

TITLE: P.C. ASSY AMP/LOGIC B
DWG NO. 46016-00 REV -T-
SHEET 2 OF 3

PRESTON SCIENTIFIC INC.
PRINTED 1/15/76

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	46019-00	D&R ASSY AMP LOGIC B	C
040	6	521-00	RESISTOR 1/4W 10% 22	
045	2	522-00	RESISTOR 1/4W 10% 33	
050	2	523-00	RESISTOR 1/4W 10% 47	
060	10	525-00	RESISTOR 1/4W 10% 100	
070	1	527-00	RESISTOR 1/4W 10% 220	
080	2	529-00	RESISTOR 1/4W 10% 470	
090	3	531-00	RESISTOR 1/4W 10% 1K	
100	5	533-00	RESISTOR 1/4W 10% 2200	
120	2	538-00	RESISTOR 1/4W 10% 10K	
140	1	394-22	RESISTOR 1/4W 1% 61.9	
150	4	401-04	RESISTOR 1/4W 1% 402	
160	2	405-00	RESISTOR 1/4W 1% 590	
170	4	440-00	RESISTOR 1/4W 1% 4020	
180	2	456-03	RESISTOR 1/4W 1% 10K	
190	3	479-00	RESISTOR 1/4W 1% 200K	
200	1	561-00	RESISTOR 1/2W 10% 22	
210	1	998-07	RESISTOR .02% 796	
220	1	998-16	RESISTOR .02% 1587.7	
230	3	998-10	RESISTOR .02% 1K	
240	1	998-24	RESISTOR .02% 3160	
250	1	998-26	RESISTOR .02% 3200	
260	1	342-01	POTENTIOMETER 100	
270	2	347-01	POTENTIOMETER 2K	
280	1	372-03	POTENTIOMETER 50K	
290	2	79-01	CAPACITOR TRIMMER 2-8PF	
310	6	50-01	CAPACITOR 5PF	
320	4	52-01	CAPACITOR 5% 10PF	
350	4	72-01	CAPACITOR 10% 470PF	
360	11	93-01	CAPACITOR 10% .01UF	
370	2	116-00	CAPACITOR 2UF 50V	
380	2	131-00	CAPACITOR 20% 2.2UF 20V	
385	1	133-00	CAPACITOR 20% 2.2UF 35V	
390	15	239-00	DIODE 1N4148	
400	2	248-13	DIODE ZENER 1N5241B	
410	2	244-08	DIODE ZENER 1N5232B	
420	4	247-20	DIODE ZENER 1N5255B	
425	2	248-22	DIODE 5082-2810	
430	1	824-00	TRANSISTOR 2N1132	
440	2	828-00	TRANSISTOR 2N1711	
460	4	846-00	TRANSISTOR 2N3904	
470	2	846-01	TRANSISTOR 2N3906	
480	2	846-08	TRANSISTOR 2N4939	
485	2	9922-00	TRANSISTOR SELECT	A
490	2	845-10	TRANSISTOR E7001	
500	1	842-01	TRANSISTOR 2N4264	
510	2	848-24	INTEGRATED CIRCUIT 74H50	
520	1	848-48	INTEGRATED CIRCUIT 74H10	

TITLE: P.C. ASSY AMP/LOGIC B
DWG NO. 46016-01 REV -T-
SHEET 3 OF 3

PRESTON SCIENTIFIC INC.
PRINTED 1/19/76

PARTS LIST

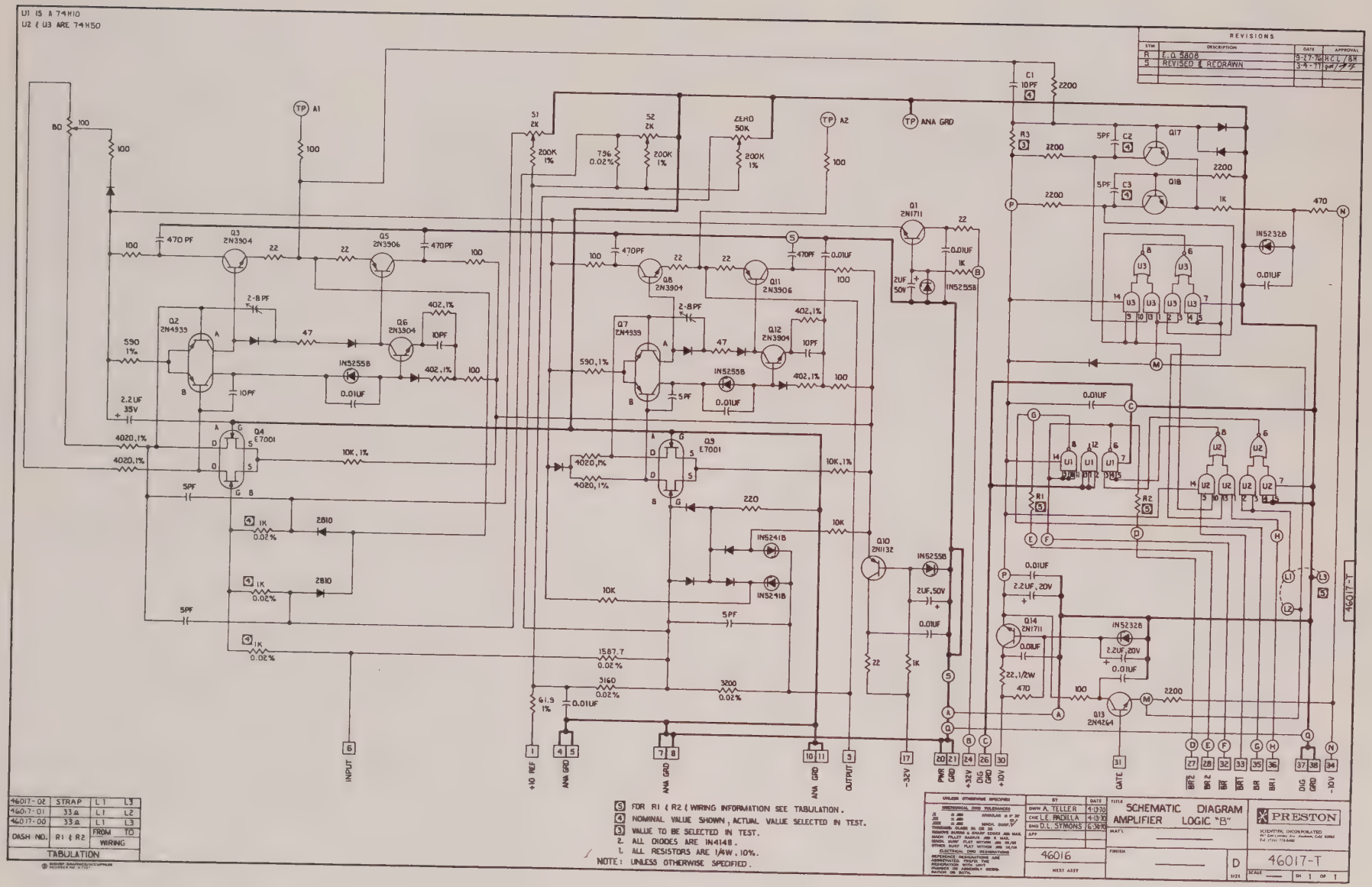
ITEM	QTY	PART NO.	DESCRIPTION	
010	1	46019-00	D&R ASSY AMP LOGIC B	C
040	6	521-00	RESISTOR 1/4W 10% 22	
045	2	522-00	RESISTOR 1/4W 10% 33	
050	2	523-00	RESISTOR 1/4W 10% 47	
060	10	525-00	RESISTOR 1/4W 10% 100	
070	1	527-00	RESISTOR 1/4W 10% 220	
080	2	529-00	RESISTOR 1/4W 10% 470	
090	3	531-00	RESISTOR 1/4W 10% 1K	
100	5	533-00	RESISTOR 1/4W 10% 2200	
120	2	538-00	RESISTOR 1/4W 10% 10K	
140	1	394-22	RESISTOR 1/4W 1% 61.9	
150	4	401-04	RESISTOR 1/4W 1% 402	
160	2	405-00	RESISTOR 1/4W 1% 590	
170	4	440-00	RESISTOR 1/4W 1% 4020	
180	2	456-03	RESISTOR 1/4W 1% 10K	
190	3	479-00	RESISTOR 1/4W 1% 200K	
200	1	561-00	RESISTOR 1/2W 10% 22	
210	1	998-07	RESISTOR .02% 796	
220	1	998-16	RESISTOR .02% 1587.7	
230	3	998-10	RESISTOR .02% 1K	
240	1	998-24	RESISTOR .02% 3160	
250	1	998-26	RESISTOR .02% 3200	
260	1	342-01	POTENTIOMETER 100	
270	2	347-01	POTENTIOMETER 2K	
280	1	372-03	POTENTIOMETER 50K	
290	2	79-01	CAPACITOR TRIMMER 2-8PF	
310	6	50-01	CAPACITOR 5PF	
320	4	52-01	CAPACITOR 5% 10PF	
350	4	72-01	CAPACITOR 10% 470PF	
360	11	93-01	CAPACITOR 10% .01UF	
370	2	116-00	CAPACITOR 2UF 50V	
380	2	131-00	CAPACITOR 20% 2.2UF 20V	
385	1	133-00	CAPACITOR 20% 2.2UF 35V	
390	15	239-00	DIODE 1N4148	
400	2	248-13	DIODE ZENER 1N5241B	
410	2	244-08	DIODE ZENER 1N5232B	
420	4	247-20	DIODE ZENER 1N5255B	
425	2	248-22	DIODE 5082-2810	
430	1	824-00	TRANSISTOR 2N1132	
440	2	828-00	TRANSISTOR 2N1711	
460	4	846-00	TRANSISTOR 2N3904	
470	2	846-01	TRANSISTOR 2N3906	
480	2	846-08	TRANSISTOR 2N4939	
485	2	9922-00	TRANSISTOR SELECT	A
490	2	845-10	TRANSISTOR E7001	
500	1	842-01	TRANSISTOR 2N4264	
510	2	848-24	INTEGRATED CIRCUIT 74H50	
520	1	848-48	INTEGRATED CIRCUIT 74H10	

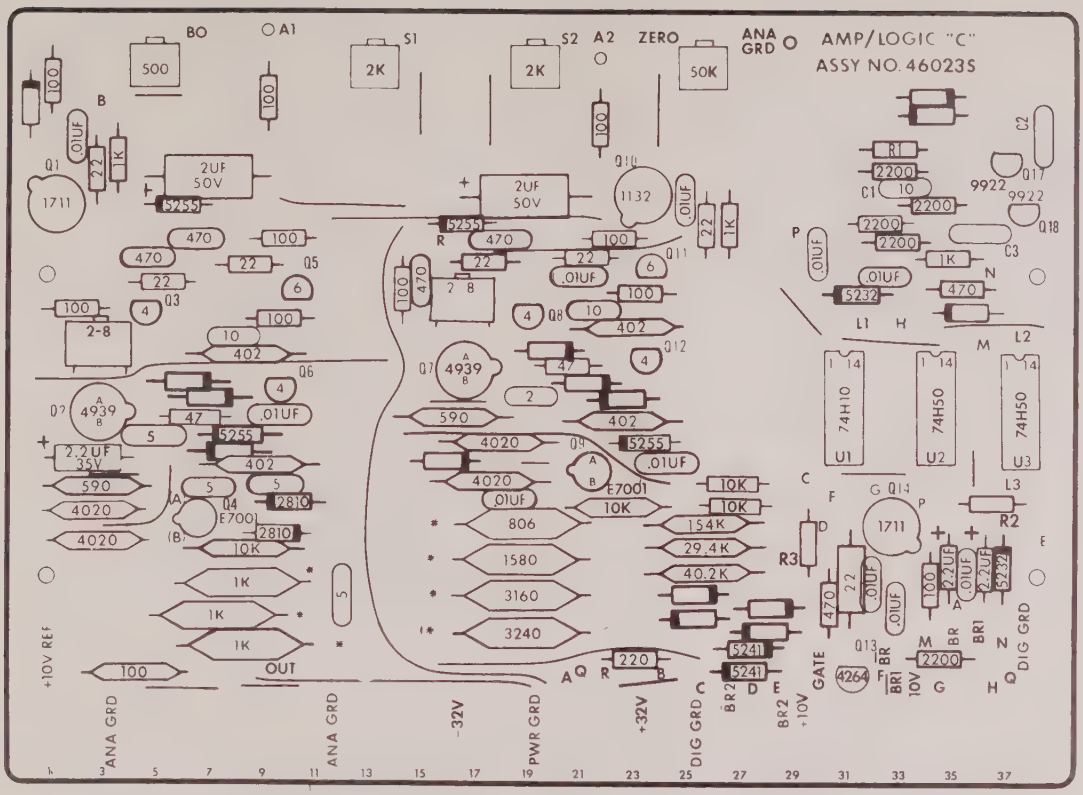
TITLE: P.C. ASSY AMP/LOGIC B -T-
DWG NO. 46016-02 REV ...T...
SHEET 3 OF 3

PRESTON SCIENTIFIC INC.
PRINTED 09/27/76

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
10	1	46019-00	D&R ASSY AMP LOGIC B	C
40	6	521-00	RESISTOR 1/4W 10% 22	
50	2	523-00	RESISTOR 1/4W 10% 47	
60	10	525-00	RESISTOR 1/4W 10% 100	
70	1	527-00	RESISTOR 1/4W 10% 220	
80	2	529-00	RESISTOR 1/4W 10% 470	
90	3	531-00	RESISTOR 1/4W 10% 1K	
100	5	533-00	RESISTOR 1/4W 10% 2200	
120	2	538-00	RESISTOR 1/4W 10% 10K	
140	1	394-22	RESISTOR 1/4W 1% 61.9	
150	4	401-04	RESISTOR 1/4W 1% 402	
160	2	405-00	RESISTOR 1/4W 1% 590	
170	4	440-00	RESISTOR 1/4W 1% 4020	
180	2	456-03	RESISTOR 1/4W 1% 10K	
190	3	479-00	RESISTOR 1/4W 1% 200K	
200	1	561-00	RESISTOR 1/2W 10% 22	
210	1	998-07	RESISTOR .02% 796	
220	1	998-16	RESISTOR .02% 1587.7	
230	3	998-10	RESISTOR .02% 1K	
240	1	998-24	RESISTOR .02% 3160	
250	1	998-26	RESISTOR .02% 3200	
260	1	342-01	POTENTIOMETER 100	
270	2	347-01	POTENTIOMETER 2K	
280	1	372-03	POTENTIOMETER 50K	
290	2	79-01	CAPACITOR TRIMMER 2-8PF	
310	6	50-01	CAPACITOR 5PF	
320	4	52-01	CAPACITOR 5% 10PF	
350	4	72-01	CAPACITOR 10% 470PF	
360	11	93-01	CAPACITOR 10% .01UF	
370	2	116-00	CAPACITOR 2UF 50V	
380	2	131-00	CAPACITOR 20% 2.2UF 20V	
385	1	133-00	CAPACITOR 20% 2.2UF 35V	
390	15	239-00	DIODE 1N4148	
400	2	248-13	DIODE ZENER 1N5241B	
410	2	244-08	DIODE ZENER 1N5232B	
420	4	247-20	DIODE ZENER 1N5255B	
425	2	248-22	DIODE 5082-2810	
430	1	824-00	TRANSISTOR 2N1132	
440	2	828-00	TRANSISTOR 2N1711	
460	4	846-00	TRANSISTOR 2N3904	
470	2	846-01	TRANSISTOR 2N3906	
480	2	846-08	TRANSISTOR 2N4939	
485	2	9922-00	TRANSISTOR SELECT	A
490	2	845-10	TRANSISTOR E7001	
500	1	842-01	TRANSISTOR 2N4264	
510	2	848-24	INTEGRATED CIRCUIT 74H50	
520	1	848-48	INTEGRATED CIRCUIT 74H10	


U1 IS A 74H10
U2 & U3 ARE 74H50
REVISIONS
R E.O. 5808 9-27-76 HCL/BH
S REVISED & REDRAWN 3-4-77
INPUT
+10 REF
ANA GRD
OUTPUT
-32V
PWR GRD
+32V
DIG GRD
+10V
GATE
BR2
BR2
BR
BR1
BR
BR1
DIG GRD
-10V
46017-T
5 FOR R1 & R2 & WIRING INFORMATION SEE TABULATION.
4 NOMINAL VALUE SHOWN, ACTUAL VALUE SELECTED IN TEST.
3 VALUE TO BE SELECTED IN TEST.
2. ALL DIODES ARE IN4148.
1. ALL RESISTORS ARE 1/4W, 10%.
NOTE: UNLESS OTHERWISE SPECIFIED.
46017-02 STRAP L1 L3
46017-01 33Ω L1 L2
46017-00 33Ω L1 L3
DASH NO. R1 & R2 FROM TO WIRING
TABULATION
DWN A. TELLER 4-13-70
CHK L.E. PADILLA 4-13-70
ENG D.L. SYMONS 6-30-70
46016
NEXT ASSY
TITLE SCHEMATIC DIAGRAM AMPLIFIER LOGIC "B"
PRESTON
SCIENTIFIC INCORPORATED
D
46017-T
SCALE
SH 1 OF 1



46023-T

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED
		SEE SHEET ONE		

TABULATION

DASH NO.	WIRE FROM	WIRE TO	R2 & R3
46023-00	L1	L3	33Ω
46023-01	L1	L2	33Ω
46023-02	L1	L3	JUMPER

8. C1 THRU C3 & R1 ARE SELECTED IN TEST.
7. FOR LIST OF MATERIAL SEE SHEET 3 OF 3.
6. FOR R2, R3, & WIRING INFORMATION L1, L2, & L3 SEE TABULATION.
5. (*) RESISTORS MUST BE TYPE NC-6.
4. ALL CAPACITOR VALUES ARE IN PF.
3. WIRE FROM POINT TO POINT "A" TO "A", ETC.
2. ALL DIODES ARE IN4148.
1. FOR SCHEMATIC DIAGRAM SEE DWG. NO. 46024.

NOTES: UNLESS OTHERWISE SPECIFIED

	BY	DATE
DRAWN	FARLAND	12-2-69
CHK	D.L. SYMONDS	12-2-69
ENGR	D.L. SYMONDS	12-30-70
APPD		
APPD		

TITLE: PRINTED CIRCUIT ASSY AMP/LOGIC "C"

PRESTON SCIENTIFIC INCORPORATED

MATERIAL

FINISH

SCALE

SIZE A

CODE

SH 2 OF 3

48125

NEXT ASSY

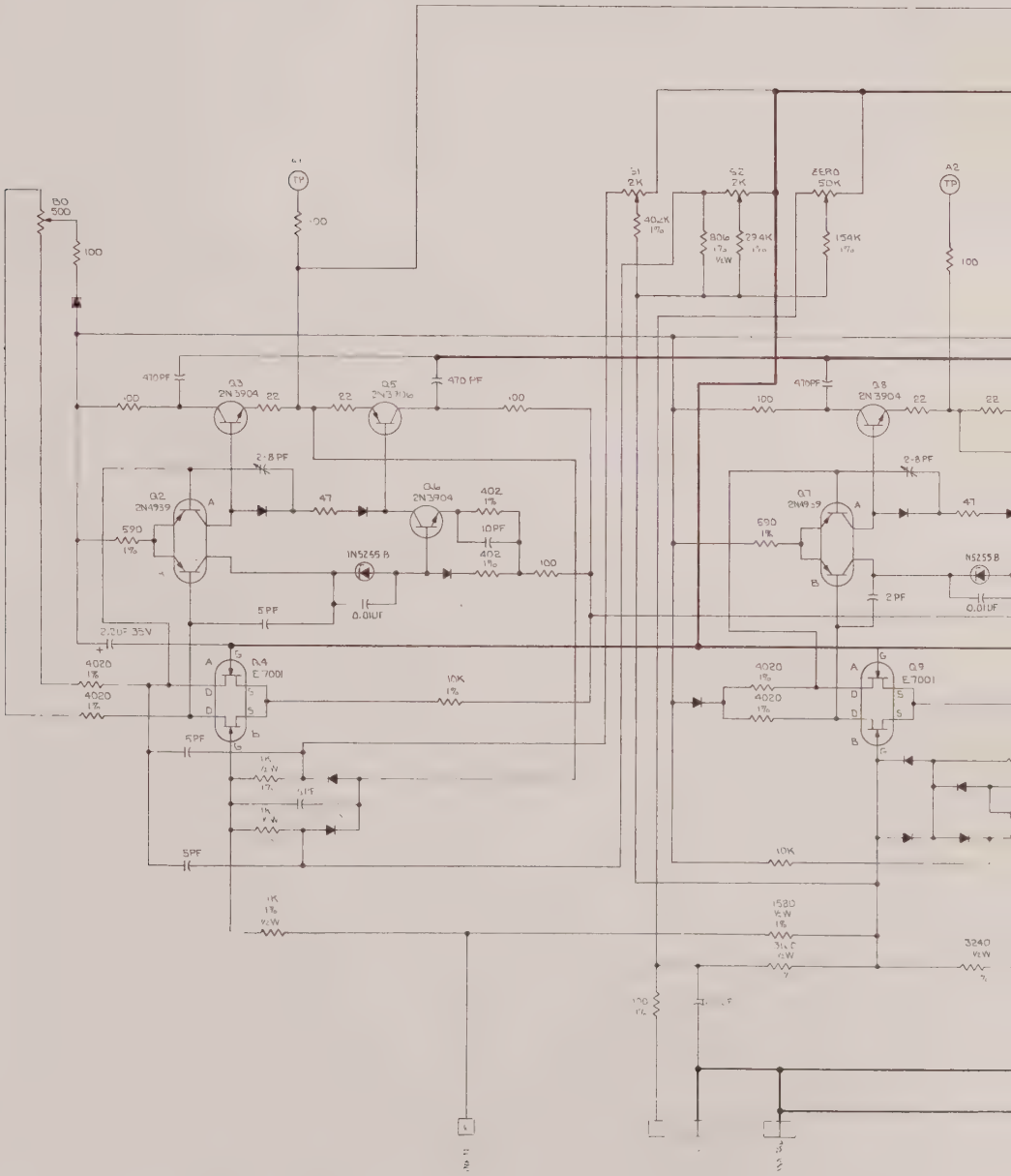
46023-T

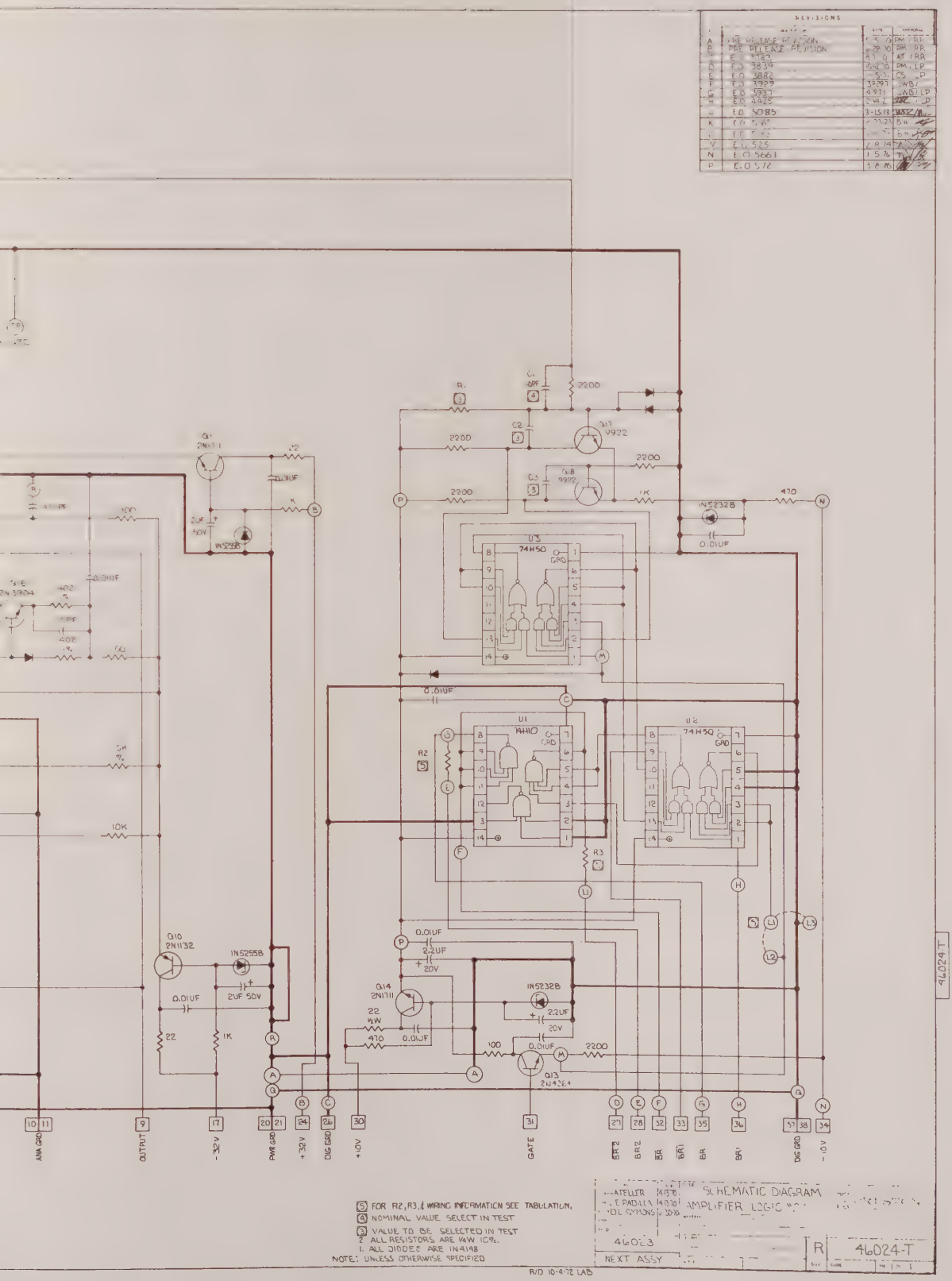
TITLE: P.C. ASSY AMP/LOGIC C
DWG NO. 46023-00 REV S
SHEET 3 OF 3

PRESTON SCIENTIFIC INC.
PRINTED 1/15/76

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	46026-00	D&R ASSY AMP LOGIC C	C
040	6	521-00	RESISTOR 1/4W 10% 22	
045	2	522-00	RESISTOR 1/4W 10% 33	
050	2	523-00	RESISTOR 1/4W 10% 47	
060	10	525-00	RESISTOR 1/4W 10% 100	
070	1	527-00	RESISTOR 1/4W 10% 220	
080	2	529-00	RESISTOR 1/4W 10% 470	
090	3	531-00	RESISTOR 1/4W 10% 1K	
100	5	533-00	RESISTOR 1/4W 10% 2200	
120	2	538-00	RESISTOR 1/4W 10% 10K	
140	1	397-13	RESISTOR 1/4W 1% 100	
150	4	401-04	RESISTOR 1/4W 1% 402	
160	2	405-00	RESISTOR 1/4W 1% 590	
180	4	440-00	RESISTOR 1/4W 1% 4020	
200	2	456-03	RESISTOR 1/4W 1% 10K	
210	1	471-03	RESISTOR 1/4W 1% 40.2K	
220	1	468-01	RESISTOR 1/4W 1% 29.4K	
230	1	478-05	RESISTOR 1/4W 1% 154K	
250	1	561-00	RESISTOR 1/2W 10% 22	
252	1	494-05	RESISTOR 1/2W 1% 806	
253	3	495-00	RESISTOR 1/2W 1% 1K	
254	1	495-06	RESISTOR 1/2W 1% 1580	
256	1	496-02	RESISTOR 1/2W 1% 3160	
258	1	496-05	RESISTOR 1/2W 1% 3240	
260	1	344-80	POTENTIOMETER 500	
270	2	346-80	POTENTIOMETER 2K	
280	1	369-02	POTENTIOMETER 50K	
290	2	79-01	CAPACITOR TRIMMER 2-8PF	
300	1	47-02	CAPACITOR 2PF	
320	4	50-01	CAPACITOR 5PF	
340	3	52-01	CAPACITOR 5% 10PF	
350	4	72-01	CAPACITOR 10% 470PF	
360	11	93-01	CAPACITOR 10% .01UF	
370	2	116-00	CAPACITOR 2UF 50V	
380	2	131-00	CAPACITOR 20% 2.2UF 20V	
385	1	133-00	CAPACITOR 20% 2.2UF 35V	
390	15	239-00	DIODE 1N4148	
400	2	248-13	DIODE ZENER 1N5241B	
410	2	244-08	DIODE ZENER 1N5232B	
420	4	247-20	DIODE ZENER 1N5255B	
421	2	248-22	DIODE 5082-2810	
430	1	824-00	TRANSISTOR 2N1132	
440	2	828-00	TRANSISTOR 2N1711	
460	4	846-00	TRANSISTOR 2N3904	
470	2	846-01	TRANSISTOR 2N3906	
480	2	846-08	TRANSISTOR 2N4939	
490	2	845-10	TRANSISTOR E7001	
495	2	9922-00	TRANSISTOR SELECT	A
500	1	842-01	TRANSISTOR 2N4264	
510	2	848-24	INTEGRATED CIRCUIT 74H50	
520	1	848-48	INTEGRATED CIRCUIT 74H10	


B0
500
100
C1
TP
.00
S1
2K
S2
2K
ZERO
50K
A2
TP
40.2K
1%
806
1%
VLW
2.94K
1%
VLW
154K
1%
100
470PF
Q3
2N3904
22
22
Q5
2N3906
470 PF
100
2-8 PF
Q2
2N4939
A
590
1%
47
Q6
2N3904
402
1%
10PF
402
1%
1N5235B
100
5PF
0.01UF
2.2UF 35V
4020
1%
4020
1%
Q4
E 7001
A
G
D
S
D
S
B
G
10K
1%
5PF
1K
1/2W
1%
.01F
1K
1/2W
5PF
1K
1%
VLW
100
1%
470PF
Q8
2N3904
100
22
22
2-8 PF
Q7
2N4939
A
590
1%
B
47
1N5235B
2 PF
0.01UF
4020
1%
4020
1%
Q9
E 7001
A
G
D
S
D
S
B
C
10K
1580
1/2W
1%
3240
VLW
100
1%



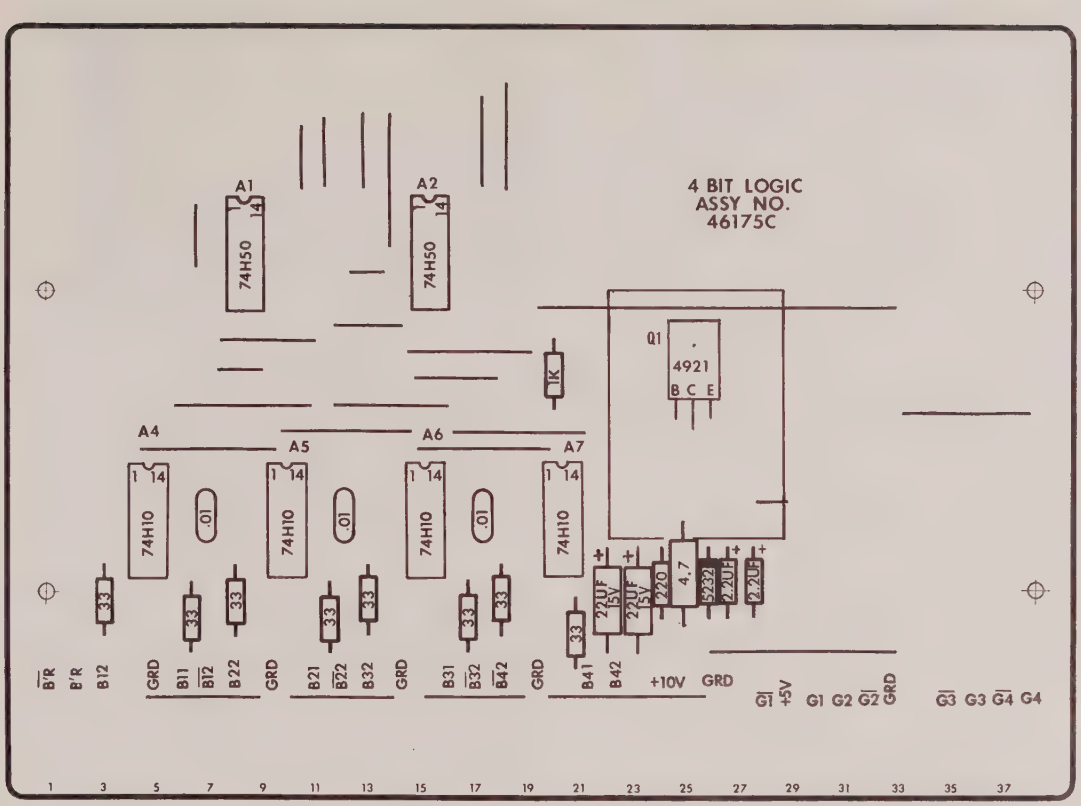
5 FOR R2, R3, & WIRING INFORMATION SEE TABULATION.
4 NOMINAL VALUE SELECT IN TEST
3 VALUE TO BE SELECTED IN TEST
2 ALL RESISTORS ARE 1/4W 10%.
1. ALL DIODES ARE 1N4148
NOTE: UNLESS OTHERWISE SPECIFIED

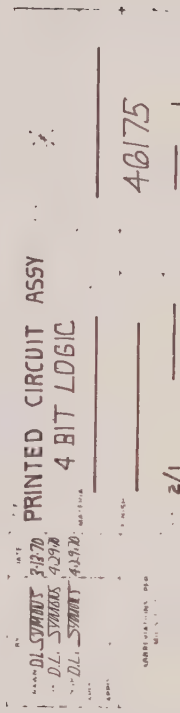
SCHEMATIC DIAGRAM
AMPLIFIER LOGIC

46023
NEXT ASSY

R 46024-T

R/D 10-4-72 LAB





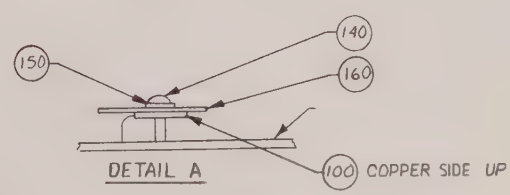
TITLE: P.C. ASSY 4 BIT LOGIC
DWG NO. 46175-00 REV C
SHEET 3 OF 3

PRESTON SCIENTIFIC INC.
PRINTED 3/16/73

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	46178-00	D&R ASSY 4 BIT LOGIC	C
030	8	522-00	RESISTOR 1/4W 10% 33	
040	1	527-00	RESISTOR 1/4W 10% 220	
050	1	531-00	RESISTOR 1/4W 10% 1K	
060	1	559-00	RESISTOR 1/2W 10% 4.7	
070	1	244-08	DIODE ZENER 1N5232B	
080	3	93-01	CAPACITOR 10% .01UF	
090	2	131-00	CAPACITOR 20% 2.2UF 20V	
095	2	144-00	CAPACITOR 20% 22UF 15V	
100	1	846-03	TRANSISTOR 2N4921	
110	2	848-24	INTEGRATED CIRCUIT 74H50	
120	4	848-48	INTEGRATED CIRCUIT 74H10	
140	1	665-00	SCREW PHMS 4-40 X 5/16	
150	1	859-02	WASHER SHOULDER NYLON	
160	1	46079-00	HEATSINK	A

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
		SEE SHEET 1 OF 1 FOR REVISIONS		



DETAIL A

3. FOR HEATSINK ASSY SEE DETAIL A
2. FOR SCHEMATIC DIAGRAM SEE DWG 46176.
1. ALL RESISTORS ARE 1/4W, 10%.
NOTE : UNLESS OTHERWISE SPECIFIED

BY	DATE
DRAWN D.L. SYMONS	3-17-70
CHK D.L. SYMONS	4-29-70
ENGR D.L. SYMONS	4-29-70
APPD	
APPD	

TITLE PRINTED CIRCUIT ASSY 4 BIT LOGIC

PRESTON SCIENTIFIC INCORPORATED

MATERIAL

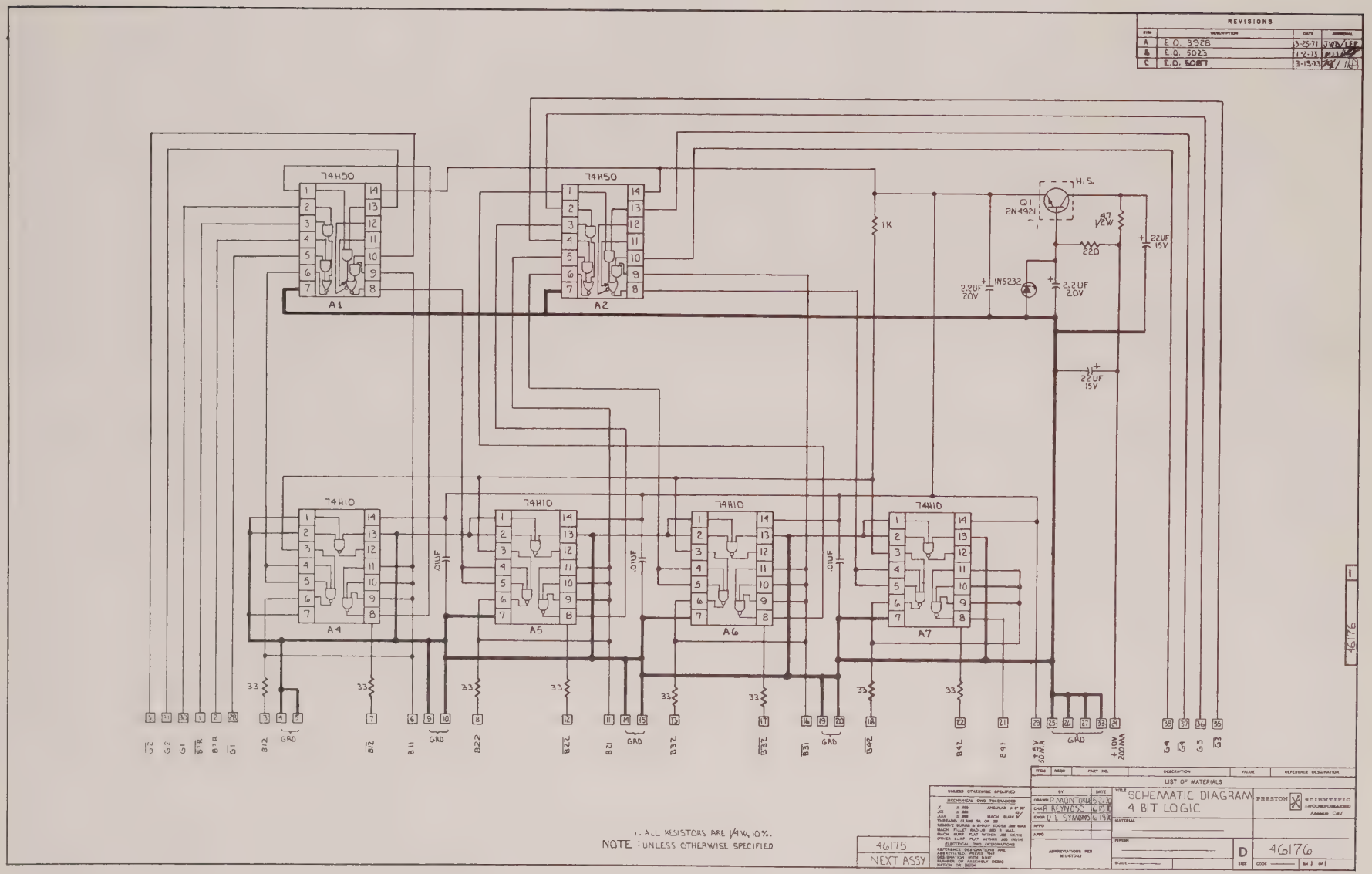
FINISH

SCALE

SIZE A

CODE 46175

SH 2 OF 3


REVISIONS
SYM | DESCRIPTION | DATE | APPROVAL
A | E.O. 3928 | 3-25-71
B | E.O. 5023 | 1-2-73
C | E.O. 5087 | 3-15-73
74H50
A1
A2
74H10
A4
A5
A6
A7
Q1
2N4921
H.S.
1K
47 1/2W
220
22UF 15V
2.2UF 20V
1N5232
.01UF
33
GRD
+5V 50MA
+10V 200MA
G2
G1
B1R
B2R
B12
B11
B22
B21
B32
B31
B42
B41
G4
G3
1. ALL RESISTORS ARE 1/4W, 10%.
NOTE : UNLESS OTHERWISE SPECIFIED
46175
NEXT ASSY
ITEM | REQD | PART NO. | DESCRIPTION | VALUE | REFERENCE DESIGNATION
LIST OF MATERIALS
UNLESS OTHERWISE SPECIFIED
MECHANICAL DWG TOLERANCES
ELECTRICAL DWG DESIGNATIONS
REFERENCE DESIGNATIONS ARE ABBREVIATED PREFIX THE DESIGNATION WITH UNIT NUMBER OF ASSEMBLY DESIGNATION OR BOOK
DRAWN P. MONTIRUE 5-27-70
CHK R. REYNOSO 6-19-70
ENGR D. L. SYMONS 6-19-70
APPD
APPD
ABBREVIATIONS PER MIL-STD-12
TITLE SCHEMATIC DIAGRAM 4 BIT LOGIC
PRESTON SCIENTIFIC INCORPORATED
Anaheim Calif
MATERIAL
FINISH
SCALE
D
SIZE
46176
CODE
SH 1 OF 1
46176

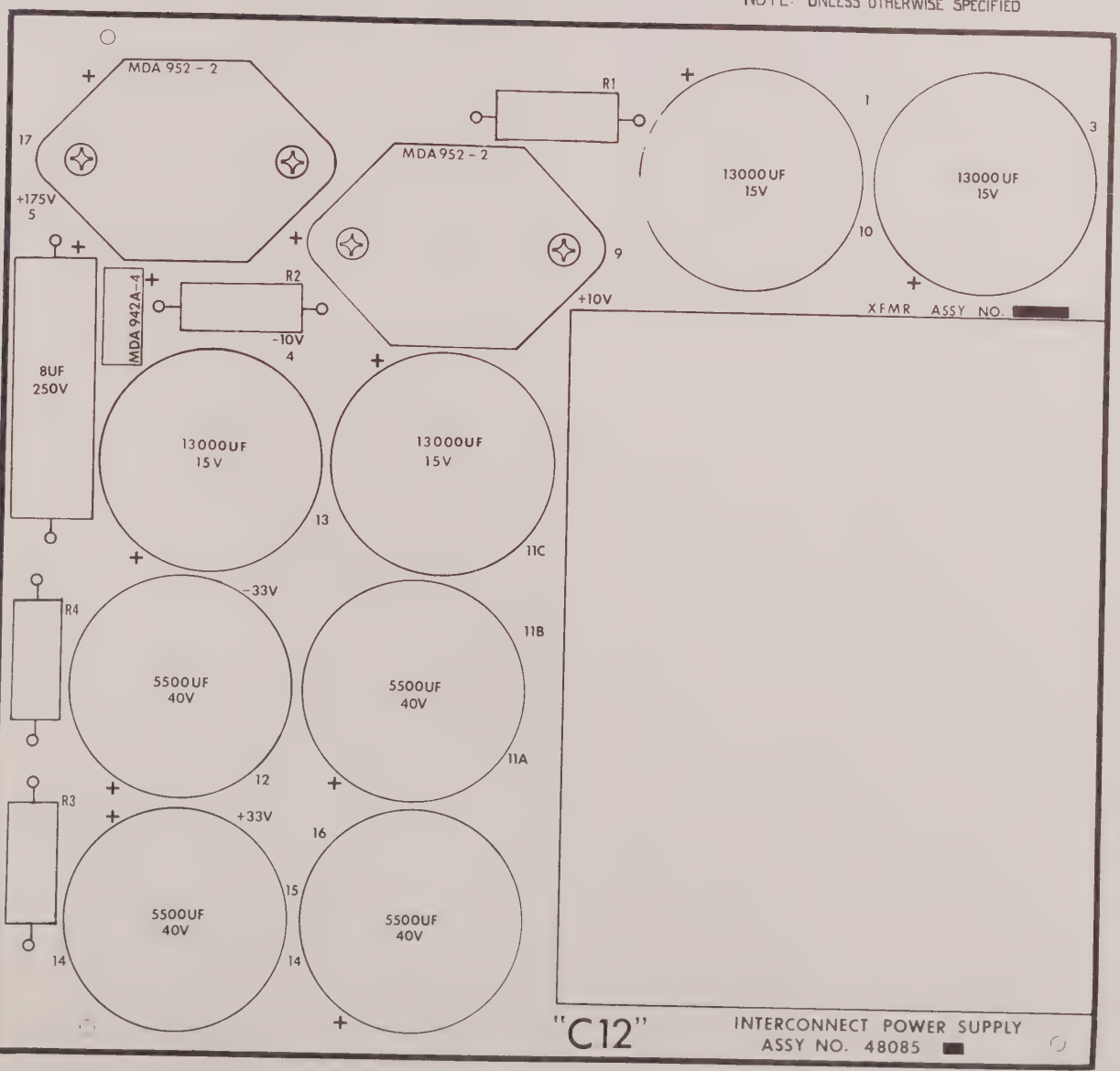
48075	BY	DATE	TITLE	PRESTON
NEXT ASSY	DRAWN F. Mayr	6-11-70	P.C. ASSY INTERCONNECT POWER SUPPLY	
	CHK R. Reynoso	6-16-70		
	ENGR D. Simmons	7-22-70	MATERIAL	
	APPD			
	APPD		FINISH	
ABBREVIATIONS PER MIL-STD-12			SCALE 2/1	C SIZE
				48085-T CODE SH 1 OF 5

10. WRAP LEADS OF 8UF, 250V CAP AROUND TERMINALS. R1 - R4 LEADS ARE TO GO NO DEEPER THAN .25 INTO TERMINAL TO ACCOMMODATE THE USE OF A TAPER PIN.

REDUCE THIS LINE TO 1.000 ± .010

9. REMOVE THE RECTIFIER MDA-952-2 WITHOUT THE THERMOSTAT BRACKET & 4 CAPACITORS 13000UF, 15V.
8. REMOVE THE RECTIFIER MDA-952-2 WITHOUT THE THERMOSTAT BRACKET & THE FOUR CAPACITORS 5500UF, 40V PER TABULATION.
7. REMOVE CAP. 8 UF, 250V & RECTIFIER MDA 942-A PER TAB.
6. MOUNT THERMOSTAT BRACKET ON RECTIFIER IN UPPER LEFT HAND CORNER OF BOARD.
5. WHEN 2 RESISTOR VALUES APPEAR IN THE TABULATION BLOCK, MOUNT THEM IN PARALLEL.
4. ALL RESISTORS ARE 3W, 5%.
3. FOR R1 THRU R4 VALUES SEE TAB, SH 3,4,&5 OF 5.
2. MARK XFMR ASSY NO. PER TAB USING WHITE INK.
1. FOR SCHEMATIC DIAGRAM POWER SUPPLY SEE TABULATION, SHEET 3,4,&5 OF 5.

NOTE: UNLESS OTHERWISE SPECIFIED



TITLE: P.C. ASSY POWER SUPPLY
DWG NO. 48085-36 REV M
SHEET 2 OF 5

PRESTON SCIENTIFIC INC.
PRINTED 12/07/73

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	48088-00	D&R ASSY INTERCONN PWR SUP	C
020	1	46027-00	TRANSFORMER ASSY	C
022	1	48229-00	THERMOSTAT BRACKET	A
025	1	609-95	RESISTOR 5W 5% .5	
028	2	608-00	RESISTOR 3W 5% 1	
030	1	608-07	RESISTOR 3W 5% 2	
050	4	157-17	CAPACITOR 13000UF 15V	
060	4	157-23	CAPACITOR 5500UF 40V	
080	2	246-01	RECTIFIER BRIDGE MDA952-2	
090	1	800-02	THERMOSTAT	
100	1	863-02	WASHER E.T. #8	
110	4	871-00	WASHER FLAT #8	
120	3	876-00	WASHER LOCK #8	
130	4	672-00	SCREW PHMS 4-40 X 1	
140	8	855-00	WASHER FLAT #4 SM	
145	16	864-00	WASHER E.T. # 10	
150	4	874-00	WASHER LOCK #4	
160	6	318-00	NUT 4-40	
170	4	313-00	NUT 8-32	
180	16	724-00	SCREW HEX HD 10-32 X 3/8	

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED

TABULATION

PART NO.	XFMR NO.	SCHEMATIC	R1 VALUE	R2 VALUE	R3 VALUE	R4 VALUE
48085-00	46027-00	56684-00	1 Ω	2 Ω	2Ω	2Ω
-01	52204-00	48086-01	1Ω	2Ω	2Ω	2Ω
-02	56060-00	56056-00	2Ω	2Ω	2Ω	2Ω
-03	56136-00	59108-00	1Ω	2Ω	2Ω	2Ω
-04	52204-00	48086-02	1Ω	.5Ω	2Ω	2Ω
-05	52204-00	48086-03	.5Ω	.25Ω	1Ω	1Ω
-06	46027-00	48086-09	1Ω	2Ω	2Ω	2Ω
-07	46027-00	48086-05	~~.3Ω, 5W~~	2Ω	~~.3Ω, 5W~~	~~.3Ω, 5W~~
-08	46027-00	48086-06	.3Ω, 5W	.3Ω, 5W	1Ω	1Ω
-09	46027-00	48086-07	~~.5Ω~~ .5Ω	2Ω	.5Ω	.5Ω
-10	46027-00	48086-08	1Ω	1Ω	2Ω	2Ω
-11	46027-00	48086-09	1Ω	1Ω	1Ω	1Ω
-12	46027-00	48086-10	.5Ω	1Ω	1Ω	1Ω
-13	46027-00	48086-11	.5Ω	2Ω	2Ω	2Ω
-14	56136-00	56056-01	2Ω	2Ω	1Ω, 3.25W	2Ω
-15	56060-00	56056-02	1Ω	2Ω	2Ω	2Ω
-16	56060-00	56056-03	.5Ω, 5W	2Ω	1Ω	1Ω
-17	56060-00	56056-04	1Ω	1Ω	1Ω	1Ω
-18	46027-00	56259-00	1Ω	2Ω	2Ω	2Ω
-19	46027-00	56259-01	.5Ω	2Ω	2Ω	2Ω
-20	46027-00	59744-00	.5Ω, 5W	2Ω	2Ω	2Ω
48085-21	56586-00	56591-00	~~.3Ω 5W~~ ~~.3Ω 5W~~	2Ω	~~.5Ω 5W~~ ~~.5Ω 5W~~	~~.5Ω 5W~~ ~~.5Ω 5W~~

BY	DATE
M. J. STEM	2-15-73
	2-21-73
	2-21-73

TITLE: PRINTED CIRCUIT ASSY INTERCONNECT POWER SUPPLY

PRESTON SCIENTIFIC INCORPORATED

MATERIAL

FINISH

SIZE A

CODE

48085-T

SCALE

SH 3 OF 5

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED

TABULATION

PART NO.	XFMR NO.	SCHEMATIC	R1 VALUE	R2 VALUE	R3 VALUE	R4 VALUE	
48085-22	46027-00	48086-12	.5Ω, 5W	.5Ω, 5W	.5Ω, 5W	.5Ω, 5W	
48085-23	46027-00	48086-13	1Ω, 5W	1Ω	1Ω, 5W	1Ω	
48085-24	46027-00	58015	.5Ω, 5W	2Ω	1Ω	1Ω	
48085-25	46027-00	48086-14	.5Ω, 5W	2Ω	1Ω	1Ω	
48085-26	46027-00	48086-15	.5Ω, 5W	1Ω, 5W	1Ω, 5W	1Ω, 5W	
48085-27	46027-00	58238	.5Ω, 5W	2Ω	1Ω	1Ω	7
48085-28	56060-00	56056-05	.3Ω, 5W	2Ω	3Ω, 5W	.3Ω, 5W	
48085-29	56060-00	56694-00	OMIT	2Ω	.5Ω, 5W	.5Ω, 5W	7
48085-30	46027-00	58511-00	.5Ω, 5W	1Ω	1Ω	1Ω	
48085-31	46027-00	60098	.5Ω, 5W	1Ω	OMIT	OMIT	7 8
48085-32	56060-00	56056-06	.5Ω	2Ω	.5Ω	.5Ω	
48085-33	56060-00	58759-00	.3Ω, 5W	2Ω	.3Ω, 5W	.3Ω, 5W	7
48085-34	56060-00	56056-07	2Ω	2Ω	OMIT	.5Ω, 5W	
48085-35	46027-00	48086-16	.5Ω, 5W	1Ω, 5W	.5Ω, 5W	1Ω, 5W	
48085-36	46027-00	58809-00	.5Ω, 5W	2Ω	1Ω	1Ω	7
48085-37	46027-00	48086-17	.5Ω	2Ω	2Ω	1Ω	
48085-38	56060-00	58759-01	1Ω	2Ω	2Ω	2Ω	7
48085-39	46027-00	48086-18	.3Ω 5W	2Ω	2Ω	2Ω	
48085-40	46027-00	58736	OMIT	OMIT	.5, 5W	.5, 5W	9
48085-41	46027-00	58809-01	.3Ω, 5W	2Ω	1Ω	1Ω	7
48085-42	46027-00	58809-02	.3Ω, 5W	.5Ω, 5W	.5Ω, 5W	.5Ω, 5W	7

BY	DATE
DRAWN M. J. STEM	2-15-73
CHK	2-21-73
ENGR	2-21-73
APPD	
APPD	

TITLE: PRINTED CIRCUIT ASSY INTERCONNECT PWR SUPPLY

PRESTON SCIENTIFIC INCORPORATED

MATERIAL

FINISH

SIZE A

CODE

48085-T

SCALE

SH 4 OF 5

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED

TABULATION

PART NO.	XFMR NO.	SCHEMATIC	R1 VALUE	R2 VALUE	R3 VALUE	R4 VALUE	
48085-43	56060-00	58759-02	.5Ω	2Ω	2Ω	2Ω	7
48085-44	56060-00	56694-01	OMIT	2Ω	.5Ω, 5W	.5Ω, 5W	7
48085-45	56060-00	58759-03	.5Ω, 5W	2Ω	1Ω	1Ω	7
48085-46	46027-00	58809-03	OMIT	2Ω	1Ω	1Ω	7
48085-47	56060-00	58759-04	.5Ω, 5W	2Ω	.5Ω, 5W	1Ω	7
48085-48	56060-00	58759-05	.3Ω, 5W	.5Ω, 5W	.5Ω, 5W	.5Ω, 5W	7
48085-49	46027-00	56694-02	OMIT	2Ω	.5Ω, 5W	.5Ω, 5W	7
48085-50	56060-00	58759-06	~~.5Ω~~ .5Ω	2Ω	.5Ω, 5W	.5Ω, 5W	7
48085-51	46027-00	58809-04	~~.5Ω 5W~~ .5Ω, 5W	2Ω	1Ω, 5W	1Ω, 5W	7
48085-52	46027-00	56694-03	OMIT	.5Ω, 5W	.5Ω, 5W	.3Ω, 5W	7
48085-53	59288-00	59289-00	.5Ω, 5W	2Ω	1Ω	1Ω	7
48085-54	59288-00	59289-01	.5Ω. 5W	2Ω	1Ω	1Ω	7
48085-55	56586-00	56591-01	~~.3Ω 5W~~ ~~.3Ω 5W~~	2Ω	~~.3Ω 5W~~ ~~.5Ω 5W~~	~~.3Ω 5W~~ ~~.5Ω 5W~~	7
48085-56	46027-00	48086-19	.2Ω, 25W	2Ω	1Ω	1Ω	
48085-57	52204-00	58809-06	1Ω	.5Ω	2Ω	2Ω	7
48085-58	56060-00	56694-04	OMIT	.5Ω, 5W	.3Ω, 5W	.3Ω, 5W	7
48085-59	56060-00	58759-07	.3Ω, 5W	.5Ω, 5W	.3Ω, 5W	.3Ω, 5W	7
48085-60	56060-00	60098-01	.5Ω. 5W	1Ω	OMIT	OMIT	7 8

BY	DATE
M. J. STEM	2-15-73
C. LOTZE	2-21-73
HILL	2-21-73

TITLE: PRINTED CIRCUIT ASSY INTERCONNECT PWR SUPPLY

PRESTON

SCIENTIFIC INCORPORATED
803 East Cerritos Ave., Anaheim, Calif. 92805
Tel. (714) 776-6400

MATERIAL

FINISH

SIZE A

CODE

48085-T

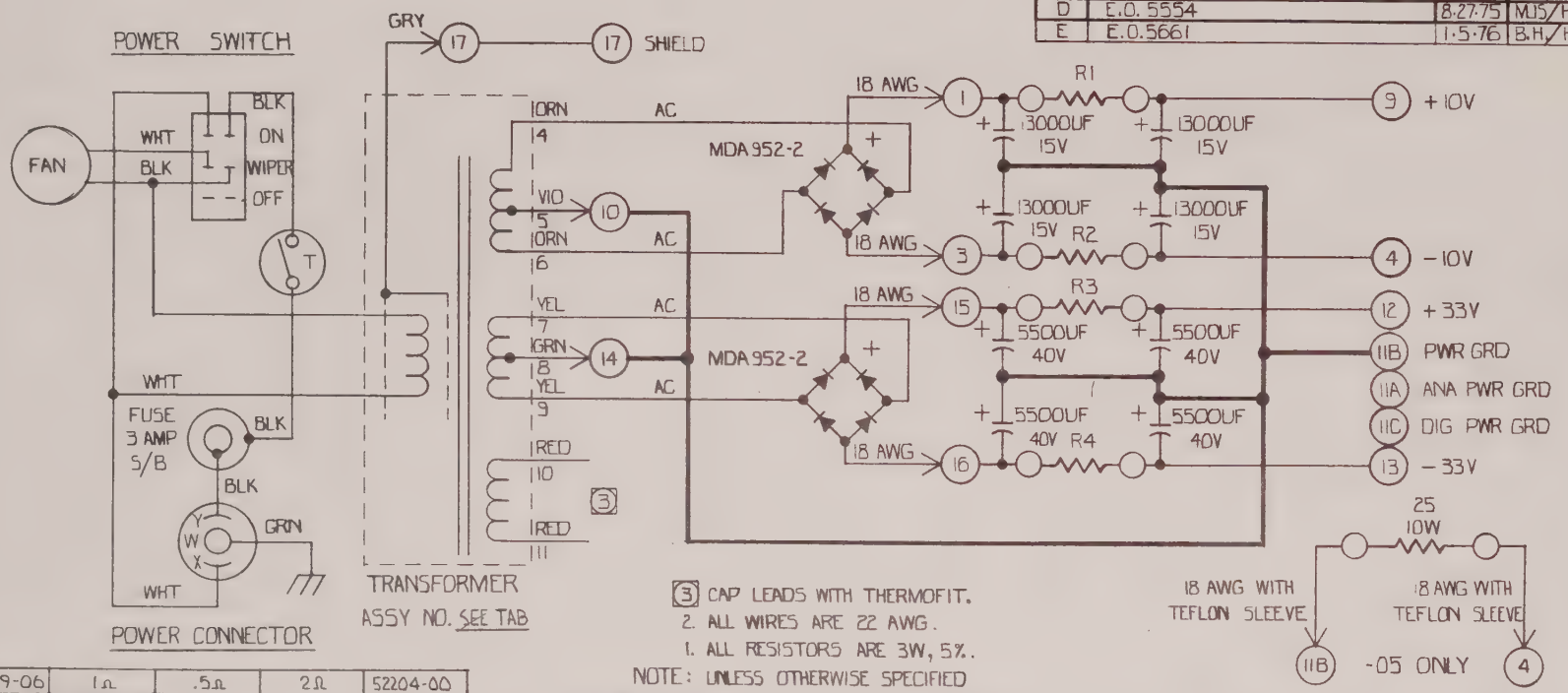
SCALE

SH 5 OF 5

T-60885

SYM	DESCRIPTION	DATE	APPROVAL
F	E.O. 5744	4-9-76	
A	E.O. 5223	12-7-73	B.H./MJS
B	E.O. 5227	12-8-73	MJS/LEP
C	E.O. 5442	1-6-75	B.H./MJS
D	E.O. 5554	8-27-75	MJS/HCL
E	E.O. 5661	1-5-76	B.H./HCL

REVISIONS



3 CAP LEADS WITH THERMOFIT.
2. ALL WIRES ARE 22 AWG.
1. ALL RESISTORS ARE 3W, 5%.
NOTE: UNLESS OTHERWISE SPECIFIED

58809-06	1Ω	.5Ω	2Ω	52204-00
58809-05	~~5Ω,5W~~ 5Ω,5W	2Ω	1Ω	46027-00
58809-04	~~5Ω,5W~~ 5Ω,5W	2Ω	1Ω,5W	
58809-03	.2Ω,25W	2Ω	1Ω	
58809-02	.3Ω,5W	.5Ω,5W	.5Ω,5W	
58809-01	.3Ω,5W	2Ω	1Ω	
58809-00	.5Ω,5W	2Ω	1Ω	46027-00
DASH NO.	R1	R2	R3 & R4	XFMR NO.

TABULATION

UNLESS OTHERWISE SPECIFIED

MECHANICAL DWG TOLERANCES

X ± .030 ANGULAR ± 0° 30'
XX ± .010
XXX ± .005 MACH. SURF. 63
THREADS: CLASS 2A OR 2B
REMOVE BURRS & SHARP EDGES .030 MAX.
MACH. FILLET RADIUS .030 R MAX.
MACH. SURF. FLAT WITHIN .001 IN/IN
OTHER SURF. FLAT WITHIN .005 IN/IN

ELECTRICAL DWG DESIGNATIONS

REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.

	BY	DATE
DWN	P.J. BROWN	9-13-73
CHK	L.E. PADILLA	9-13-73
ENG	D.L. SYMONS	9-14-73
APP		

48085-36
NEXT ASSY

TITLE: SCHEMATIC DIAGRAM INTERCONNECT PWR SUPPLY

MAT'L

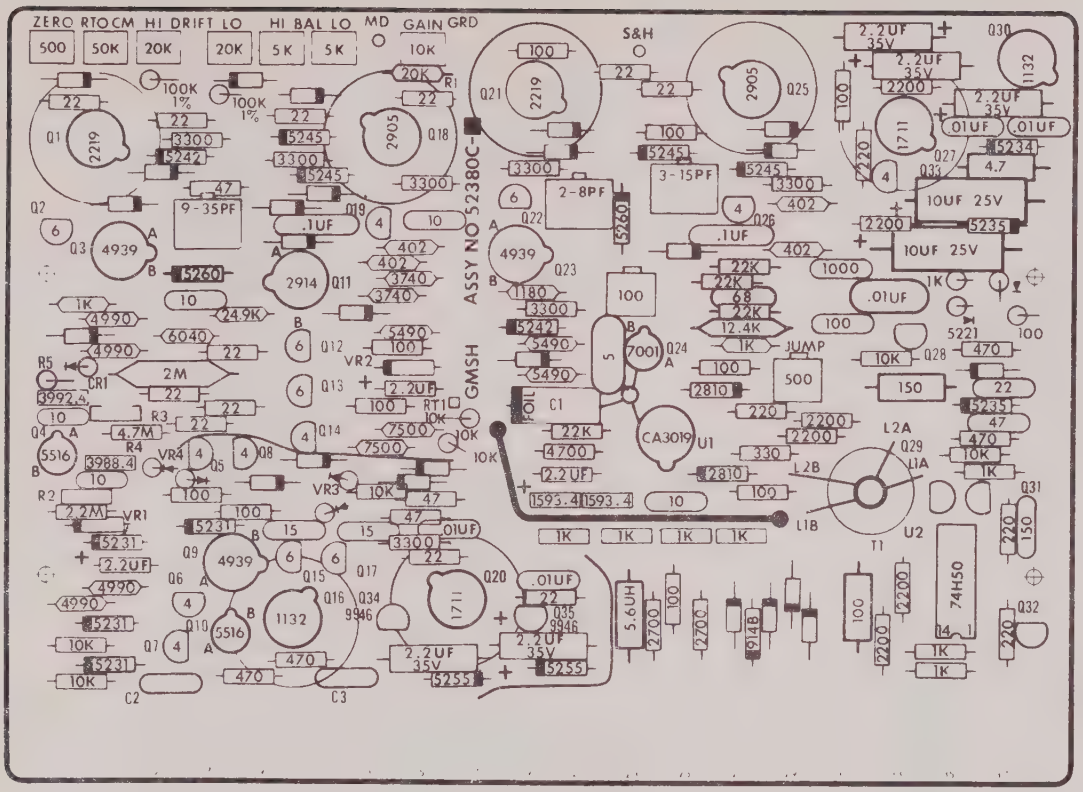
FINISH

B SIZE

PRESTON
SCIENTIFIC INCORPORATED
805 East Cerritos Ave., Anaheim, Calif. 92805
Tel. (714) 776-6400

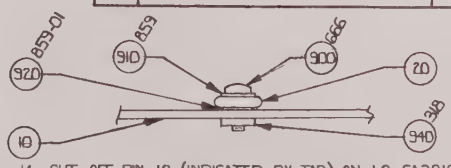
58809-T

SCALE _____ SH 1 OF 1



PRESTON SCIENTIFIC INCORPORATED 805 East Cerritos Ave., Anaheim Calif 92805 Tel (714) 776-6400			52380-T
TITLE PRINTED CIRCUIT ASSY GMSH			SH 1 OF 6
MATERIAL			CODE
FINISH		B	SIZE
SCALE 2/1			
BY	DATE		
DRAWN B. HEIDEMAN	5-9-74		
CHK			
ENGR D.L. Symons	5-9-74		
APPD			
APPD			

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHEET ONE		



14. CUT OFF PIN 10 (INDICATED BY TAB) ON I.C. CA3019.
13. INSTALL WIRE (ITEM 960) & SOLDER BOTH SIDES IN HOLES WITH CIRCUITRY ON COMPONENT SIDE WHERE APPLICABLE.
12. ALL TRANSISTORS ARE 2N4264.
11. TERMINATE ONE END OF TWISTED PAIR & SOLDER LEADS TO L1A & L2A RESPECTIVLY. USING OHM-METER INSTALL ONE OF THE REMAINING ENDS TO L1B SO THAT CONTINUITY IS MAINTAINED WITH L1A. INSTALL REMAINING WIRE TO L2B.
10. FOR C1,R2,R3,& VR1-VR4 VALUES SEE TABULATION SHEET 3 OF 5.
9. CR1,C2,C3,R1,R4 & R5 TO BE SELECTED IN TEST R1 & R4 NOMINAL VALUE SHOWN.
8. INSTALL TRANSISTOR PADS (ITEM 950) UNDER Q1,16,18,20,21,25, & 27.
7. WIRE POINT TO POINT "H" TO "H" ON CIRCUIT SIDE.
6. FOR TRANSFORMER ASSY SEE DETAIL "A".
5. ALL CAPACITOR VALUES ARE IN PF.
4. ALL RESISTORS ARE 1/4W, 10%.
3. ALL DIODES ARE 1N4148.
2. FOR LIST OF MATERIALS SEE SHEET 4,5 & 6 OF 6.
1. FOR SCHEMATIC DIAGRAM SEE DWG NO. 52381-T.

NOTE: UNLESS OTHERWISE SPECIFIED.

BY	DATE	TITLE PRINTED CIRCUIT ASSY GMSH	PRESTON SCIENTIFIC INCORPORATED 805 East Cerritos Ave., Anaheim Calif 92805 Tel (714) 776-6400
DWN B. HEIDEMAN	5-9-74		
CHK L.E. PADILLA	5-9-74		
ENG D.L. SYMONS	5-9-74	MAT'L	
APP			
58700		FINISH	A
NEXT ASSY			SIZE
			52380-T
			SCALE SH 2 OF 6

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHEET ONE		

52380-XX

TABULATION	
DASH NO.	C1 VALUE
52380-0X	100 PF
52380-1X	200 PF

TABULATION							
DASH NO.	FUNCTION	R2 VALUE	R3 VALUE	VR1 VALUE	VR2 VALUE	VR3 VALUE	VR4 VALUE
52380-X1	10 V.F.S.	3988.4	3988.4	IN5240B	IN5240B	IN962B	IN962B
52380-X2	5 V.F.S.	1993	1993	IN5240B	IN5240B	IN5234B	IN5234B
52380-X3	16.384 V.F.S.	6528.1	6528.1	IN5234B	IN5234B	IN962B	IN962B
52380-X4	10.24 V.F.S.	4084	4084	IN5241B	IN5241B	IN962B	IN962B
52380-X5	8.192 V.F.S	3267.30	3267.30	IN5239B	IN5239B	IN962B	IN962B
52380-X6	2 V.F.S.	797.592	797.592	IN5226B	IN5226B	IN5226B	IN5226B
52380-X7	2.5 V.F.S	997.1	997.1	IN5227B	IN5227B	IN5227B	IN5227B
52380-X8	1.0 V.F.S.	398.84	398.84	IN5221B	IN5221B	IN5226B	IN5226B
52380-X9	8 V.F.S.	3190.72	3190.72	IN5239B	IN5239B	IN962B	IN962B

UNLESS OTHERWISE SPECIFIED

MECHANICAL DWG TOLERANCES

X ± .005 ANGULAR ± 0° 30'
XX ± .020
XXX ± .005 MACH. SURF. √
THREADS: CLASS 2A OR 2B
REMOVE BURRS & SHARP EDGES .020 MAX.
MACH. FILLET RADIUS .031 R MAX.
MACH. SURF. FLAT WITHIN .001 IN/IN
OTHER SURF. FLAT WITHIN .005 IN/IN

ELECTRICAL DWG DESIGNATIONS

REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.

	BY	DATE
DWN	B. HEIDEMAN	5-9-74
CHK	L. E. PADILLA	5-9-74
ENG	D. L. SYMONS	5-9-74
APP		

58700
NEXT ASSY

TITLE PRINTED CIRCUIT ASSY GMSH

MAT'L

FINISH

B
SIZE

PRESTON
SCIENTIFIC INCORPORATED
803 East Cerritos Ave., Anaheim, Calif. 92805
Tel (714) 776-6400

52380-T

SCALE ——— SH 3 OF 6

TITLE: P.C. ASSY GMSH
DWG NO. 52380-14 REV ...G..
SHEET. 1. OF. 2.

PRESTON SCIENTIFIC INC.
PRINTED 04/15/77

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
10	1	52383-00	D&R ASSY GMSH	C
20	1	52099-00	TRANSFORMER ASSY	B
30	12	521-00	RESISTOR 1/4W 10% 22	
40	3	523-00	RESISTOR 1/4W 10% 47	
60	11	525-00	RESISTOR 1/4W 10% 100	
70	4	527-00	RESISTOR 1/4W 10% 220	
80	1	528-00	RESISTOR 1/4W 10% 330	
90	4	529-00	RESISTOR 1/4W 10% 470	
100	4	531-00	RESISTOR 1/4W 10% 1K	
110	6	533-00	RESISTOR 1/4W 10% 2200	
120	2	534-00	RESISTOR 1/4W 10% 2700	
130	7	535-00	RESISTOR 1/4W 10% 3300	
140	1	536-00	RESISTOR 1/4W 10% 4700	
150	8	538-00	RESISTOR 1/4W 10% 10K	
160	4	541-00	RESISTOR 1/4W 10% 22K	
170	1	551-00	RESISTOR 1/4W 10% 1M	
180	1	555-00	RESISTOR 1/4W 10% 4.7M	
190	1	459-00	RESISTOR 1/4W 1% 12.4K	
200	4	386-03	RESISTOR 1/8W 1% 402	
220	2	387-08	RESISTOR 1/8W 1% 1K	
230	1	387-09	RESISTOR 1/8W 1% 1180	
250	2	388-02	RESISTOR 1/8W 1% 3740	
260	4	389-01	RESISTOR 1/8W 1% 4990	
270	3	389-02	RESISTOR 1/8W 1% 5490	
280	1	390-03	RESISTOR 1/8W 1% 6040	
290	2	390-04	RESISTOR 1/8W 1% 7500	
300	1	392-00	RESISTOR 1/8W 1% 20K	
310	1	392-01	RESISTOR 1/8W 1% 24.9K	
320	2	393-05	RESISTOR 1/8W 1% 100K	
330	1	559-00	RESISTOR 1/2W 10% 4.7	
335	1	565-00	RESISTOR 1/2W 10% 100	
340	1	566-00	RESISTOR 1/2W 10% 150	
350	1	488-11	RESISTOR 1/2W 1% 2M	
360	4	998-10	RESISTOR .02% 1K	
370	2	998-15	RESISTOR .02% 1593.4	
380	1	998-25	RESISTOR .02% 3988.4	
390	1	998-30	RESISTOR .02% 3992.4	
395	2	998-42	RESISTOR .02% 4084	
400	1	374-05	THERMISTOR 10K	
410	1	341-04	POTENTIOMETER 100	
420	2	344-80	POTENTIOMETER 500	
450	2	351-80	POTENTIOMETER 5K	
460	1	358-80	POTENTIOMETER 10K	
465	2	360-03	POTENTIOMETER 20K	
470	1	369-02	POTENTIOMETER 50K	
480	28	239-00	DIODE 1N4148	
490	1	239-01	DIODE 1N914B	
495	2	240-80	DIODE ZENER 1N962B	
500	1	244-04	DIODE ZENER 1N5221B	
510	4	248-06	DIODE ZENER 1N5231B	

TITLE: P.C. ASSY GMSH
DWG NO. 52380-14 REV ....G.
SHEET..2. OF.6..

PRESTON SCIENTIFIC INC.
PRINTED 04/15/77

PARTS LIST

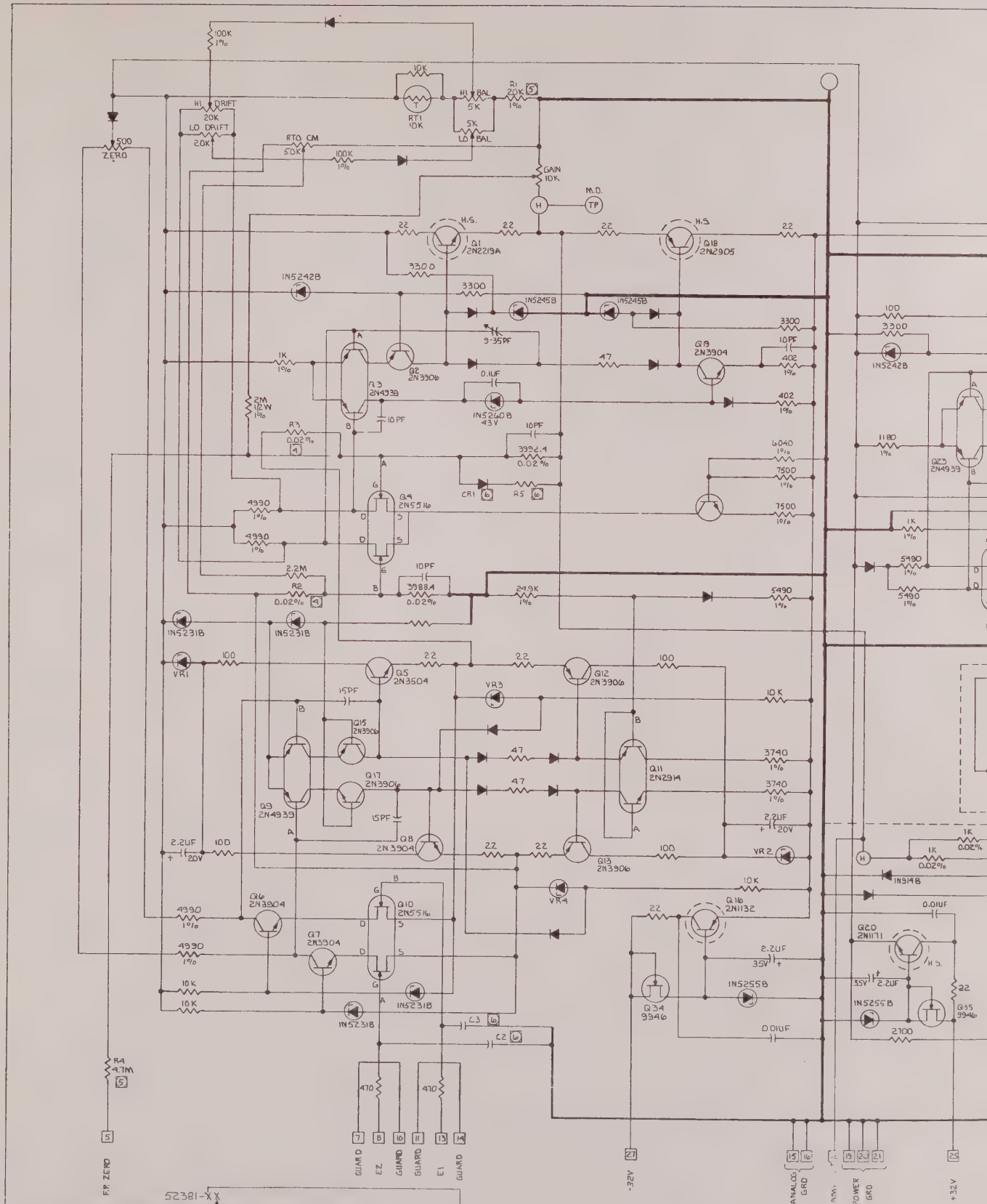
ITEM	QTY	PART NO.	DESCRIPTION	
520	1	248-08	DIODE ZENER	1N5234B
530	2	234-02	DIODE ZENER	1N5235B
540	2	248-13	DIODE ZENER	1N5241B
550	2	237-00	DIODE ZENER	1N5242B
560	4	248-12	DIODE ZENER	1N5245B
570	4	247-20	DIODE ZENER	1N5255B
580	2	248-22	DIODE	5082-2810
610	1	50-00	CAPACITOR	5PF
620	5	52-01	CAPACITOR 5%	10PF
623	2	53-02	CAPACITOR 5%	15PF
625	1	55-01	CAPACITOR 5%	22PF
630	1	58-01	CAPACITOR 10%	47PF
650	1	60-01	CAPACITOR 10%	68PF
660	1	61-01	CAPACITOR 10%	100PF
670	1	63-02	CAPACITOR 10%	150PF
675	1	64-01	CAPACITOR 5%	200PF
680	1	76-02	CAPACITOR 20%	1000PF
690	1	79-01	CAPACITOR TRIMMER	2-8PF
700	1	78-01	CAPACITOR TRIMMER	3-15PF
705	1	77-01	CAPACITOR TRIMMER	9-35PF
710	4	93-01	CAPACITOR 10%	.01UF
720	1	93-00	CAPACITOR 10%	.01UF
725	2	111-00	CAPACITOR 20%	.1UF
730	3	131-00	CAPACITOR 20%	2.2UF 20V
740	5	133-00	CAPACITOR 20%	2.2UF 35V
750	2	142-00	CAPACITOR	10UF 25V
752	1	8-07	CHOKE 1/2W 10%	5.6UH
755	2	824-00	TRANSISTOR	2N1132
760	2	828-00	TRANSISTOR	2N1711
770	2	830-02	TRANSISTOR	2N2219A
780	2	838-02	TRANSISTOR	2N2905A
790	1	838-04	TRANSISTOR	2N2914
800	8	846-00	TRANSISTOR	2N3904
810	6	846-01	TRANSISTOR	2N3906
820	4	842-01	TRANSISTOR	2N4264
830	3	846-08	TRANSISTOR	2N4939
840	2	847-12	TRANSISTOR	2N5516
850	1	845-10	TRANSISTOR	E7001
855	2	9946-00	TRANSISTOR SELECT	A
860	1	848-32	INTEGRATED CIRCUIT	CA3019
870	1	848-24	INTEGRATED CIRCUIT	74H50
880	7	284-01	HEAT SINK	
890	A/R	904-00	SILICONE GREASE	
900	1	666-00	SCREW PHMS 4-40 X 3/8	
910	1	859-00	WASHER SHOULDER #4 NYLON	
920	1	859-01	WASHER SHOULDER BUSHING NYLON	
930	1	52094-01	SHIELD PLATE	A
940	1	318-00	NUT 4-40	
950	7	326-00	TRANSISTOR PAD	
960	A/R	980-00	WIRE 22 AWG	

TITLE: P.C ASSY GM8H
DWG NO. 52380-14 REV ....
SHEET. . . OF. . .

PRESTON SCIENTIFIC INC.
PRINTED 04/13/77

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
980	4	327-00	TRANSISTOR PAD



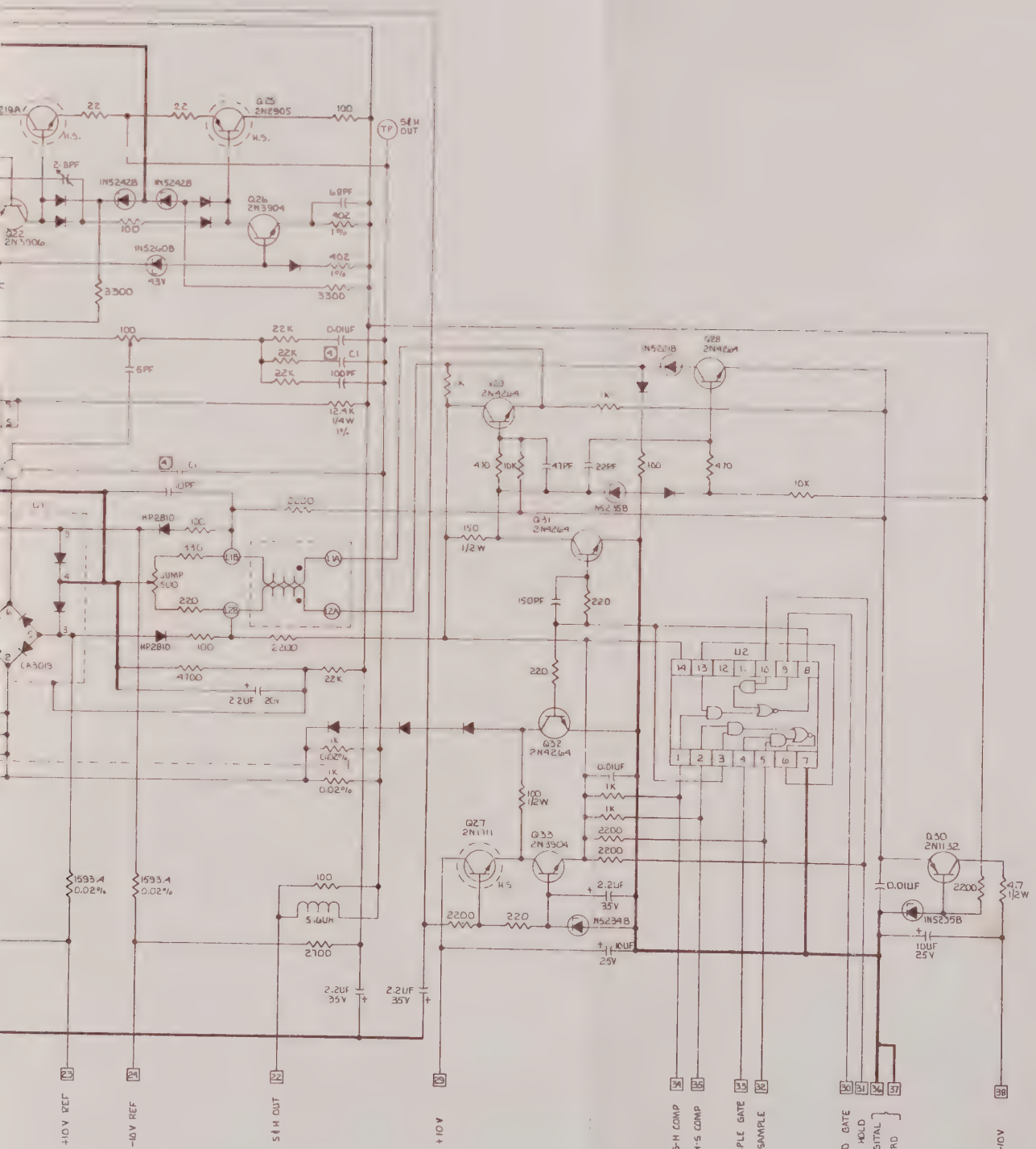
52381-XX

52381-XX	B.O V F S	313072	413072	IN5239B	IN5239B	IN962B	IN4162B
X8	1.0	398.89	398.89	IN5221B	IN5221B	IN5226B	IN5226B
X7	2.5	997.1	997.1	IN5227B	IN5227B	IN5227B	IN5227B
X6	2	137.592	137.592	IN5226B	IN5226B	IN5226B	IN5226B
X5	5.12	3267.30	3267.30	IN5239B	IN5239B	IN962B	IN962B
-X9	6.24	4084	4084	IN5241B	IN5241B	IN962B	IN962B
X3	10.384	6528.1	6528.1	IN5243B	IN5243B	IN962B	IN962B
X2	5	1993	1993	IN5240B	IN5240B	IN5234B	IN5234B
52381-X1	10 V F S	3988.9	3988.9	IN5240B	IN5240B	IN962B	IN962B
DASH NO.	FUNCTION	R2 VALUE	R3 VALUE	VR1 VALUE	VR2 VALUE	VR3 VALUE	VR4 VALUE

TABULATION

52381-1X	200 PF
52381-0X	0 PF
DASH NO.	C1 VALUE

REVISIONS			
DIM	DESCRIPTION	DATE	APPROVAL
A	E.O. 5380	9 16 74	MJS / LEP
B	E.O. 5449	2 5 75	BH / LEP
C	E.O. 5497	2 20 75	MJS / HCL



52381-T

- (W) R5, CR1, C2 & C3 TO BE SELECTED IN TEST.
- (S) R1 & R4 NOMINAL VALUE, ACTUAL VALUE SELECTED IN TEST.
- (M) FOR C1, R2 & R3 VALUE SEE TABULATION
3. ALL 1% RESISTORS ARE 1/8W
2. ALL DIODES ARE IN4148
1. ALL RESISTORS ARE 1/4W, 10%.

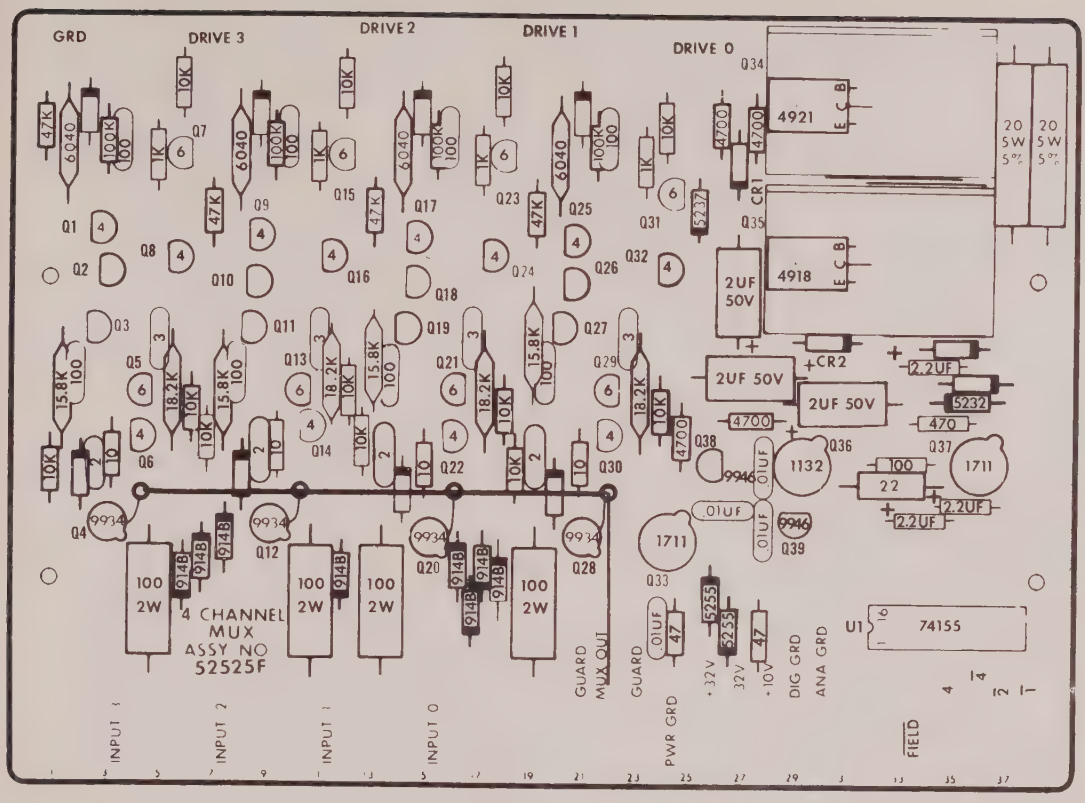
NOTE. UNLESS OTHERWISE SPECIFIED

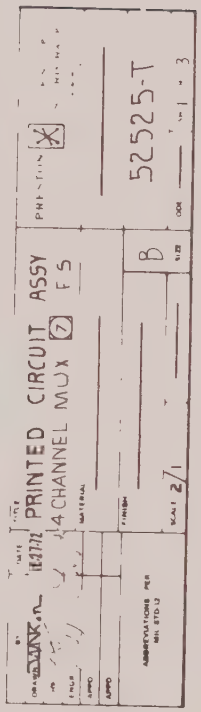
M. SYSTEM 5-9-74
L.E. VADILLA 5-9-74
D.L. SIMMONS 5-9-74

SCHEMATIC DIAGRAM
GMSH

52380-T

R 52381-T





REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

TABULATION				
DASH NO.	FULL SCALE	CR1	CR2	V1
52525-00	± 10V	IN5241B	IN5241B	11.5
52525-01	± 10.24V	IN5242B	IN5242B	12.5
52525-02	± 5.0V	IN5234B	IN5234B	6.8
52525-03	± 8.192V	IN5239B	IN5239B	9.7
52525-04	± 12.5 V	IN5243B	IN5243B	13.5
52525-05	± 2.5V	IN5227B	IN5227B	4.2

(7) FOR CR1, CR2, FULL SCALE & V1 VALUES SEE TABULATION.
6. ALL TRANSISTORS ARE 9944.
5. FOR HEATSINK ASSY SEE DETAIL "A".
4. ALL CAPACITOR VALUES ARE IN PF.
3. ALL DIODES ARE IN4148.
2. FOR PARTS LIST SEE SH 3 OF 3.
1. FOR SCHEMATIC DIAGRAM SEE DWG NO. 52526-T.
NOTE: UNLESS OTHERWISE SPECIFIED.

BY	DATE	TITLE		
DRAWN	12-28-72	PRINTED CIRCUIT ASSY 4 CHANNEL MUX (7) FULL SCALE	PRESTON	
CHK			SCIENTIFIC INCORPORATED 805 East Cerritos Ave., Anaheim, Calif. 92805 Tel. (714) 776-6400	
ENGR		MATERIAL		
APPD		FINISH		
APPD				
59830		SCALE	A	52525-T
NEXT ASSY			SIZE	CODE SH 2 OF 3

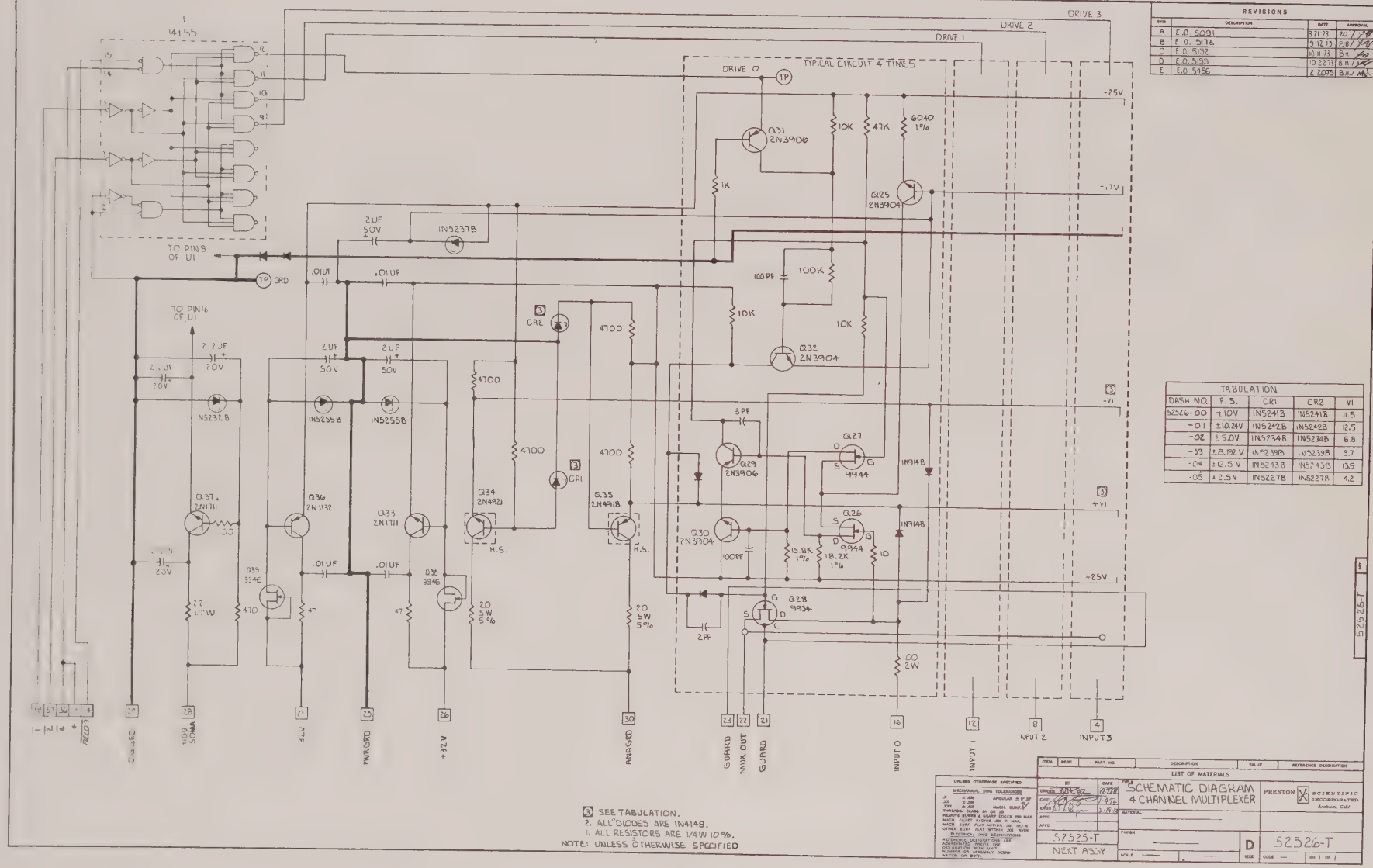
D1

TITLE: P.C. ASSY 4 CHANNEL MUX
DWG NO. 52525-00 REV A.
SHEET 3 OF 3

PRESTON SCIENTIFIC INC.
PRINTED 2/21/75

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	52526-00	DAR ASSY 4 CHANNEL MUX	C
040	4	520-00	RESISTOR 1/4W 10% 10	
045	2	523-00	RESISTOR 1/4W 10% 47	
050	1	529-00	RESISTOR 1/4W 10% 470	
060	1	535-00	RESISTOR 1/4W 10% 100	
070	4	531-00	RESISTOR 1/4W 10% 1K	
090	4	536-00	RESISTOR 1/4W 10% 4700	
100	12	538-00	RESISTOR 1/4W 10% 10K	
120	4	544-00	RESISTOR 1/4W 10% 47K	
130	4	547-00	RESISTOR 1/4W 10% 100K	
140	4	448-00	RESISTOR 1/4W 1% 6040	
150	4	460-03	RESISTOR 1/4W 1% 15.8K	
160	4	463-00	RESISTOR 1/4W 1% 18.2K	
165	1	561-00	RESISTOR 1/2W 10% 22	
170	4	607-04	RESISTOR 2W 10% 100	
180	2	609-80	RESISTOR 5W 5% 20	
190	4	93-01	CAPACITOR 10% .01UF	
195	4	47-02	CAPACITOR 2PF	
200	4	48-00	CAPACITOR 3PF	
220	8	61-01	CAPACITOR 10% 100PF	
230	3	116-00	CAPACITOR 2UF 50V	
235	3	131-00	CAPACITOR 20% 2.2UF 20V	
240	1	244-08	DIODE ZENER 1N5232B	
250	1	248-14	DIODE ZENER 1N5237B	
255	8	239-01	DIODE 1N914B	
260	2	248-13	DIODE ZENER 1N5241B	
270	2	247-30	DIODE ZENER 1N5255B	
280	10	239-00	DIODE 1N4148	
290	1	824-00	TRANSISTOR 2N1132	
300	2	828-00	TRANSISTOR 2N1711	
310	12	846-00	TRANSISTOR 2N3904	
320	8	846-01	TRANSISTOR 2N3906	
330	1	846 10	TRANSISTOR 2N4918	
340	1	846-03	TRANSISTOR 2N4921	
350	4	847-01	TRANSISTOR SELECTED 9934	
360	4	9944-00	TRANSISTOR SELECT PAIR	A
365	2	9946-00	TRANSISTOR SELECT	A
370	1	948-17	INTEGRATED CIRCUIT 74155	
390	2	666-00	SCREW PHMS 4-40 X 3/8	
400	6	855-00	WASHER FLAT #4 SM	
410	2	874-00	WASHER LOCK #4	
420	2	665-00	SCREW PHMS 4-40 X 5/16	
430	4	318-00	NUT 4-40	
440	2	51875-00	HEAT SINK	B
450	3	857-02	WASHER FLAT #4 FIBRE	



REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	E.O. 5091	3-21-73	[illegible]
B	E.O. 5176	9-12-73	[illegible]
C	E.O. 5192	10-11-73	B.H. [illegible]
D	E.O. 5199	10-22-73	B.H. [illegible]
E	E.O. 5456	2-20-75	B.H. [illegible]

TABULATION				
DASH NO.	F.S.	CR1	CR2	V1
52526-00	±10V	1N5241B	1N5241B	11.5
-01	±10.24V	1N5242B	1N5242B	12.5
-02	±5.0V	1N5234B	1N5234B	6.8
-03	±8.192V	1N5239B	1N5239B	9.7
-04	±12.5V	1N5243B	1N5243B	13.5
-05	±2.5V	1N5227B	1N5227B	4.2

3 SEE TABULATION.
2. ALL DIODES ARE 1N4148.
1. ALL RESISTORS ARE 1/4W 10%.
NOTE: UNLESS OTHERWISE SPECIFIED

ITEM	REQD	PART NO.	DESCRIPTION	VALUE	REFERENCE DESIGNATION

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
MECHANICAL DWG TOLERANCES
.X ± .030 ANGULAR ± 0° 30'
.XX ± .010 MACH. SURF. 63
.XXX ± .005
THREADS: CLASS 2A OR 2B
REMOVE BURRS & SHARP EDGES .005 MAX.
MACH. FILLET RADIUS .005 R MAX.
MACH. SURF. FLAT WITHIN .005 IN/IN
OTHER SURF. FLAT WITHIN .005 IN/IN
ELECTRICAL DWG DESIGNATIONS
REFERENCE DESIGNATIONS ARE ABBREVIATED PREFIX THE DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.

	BY	DATE
DRAWN	[illegible]	12-22-72
CHK	[illegible]	1-4-72
ENGR	[illegible]	2-19-73
APPD		
APPD		

TITLE: SCHEMATIC DIAGRAM 4 CHANNEL MULTIPLEXER

PRESTON SCIENTIFIC INCORPORATED Anaheim, Calif

MATERIAL

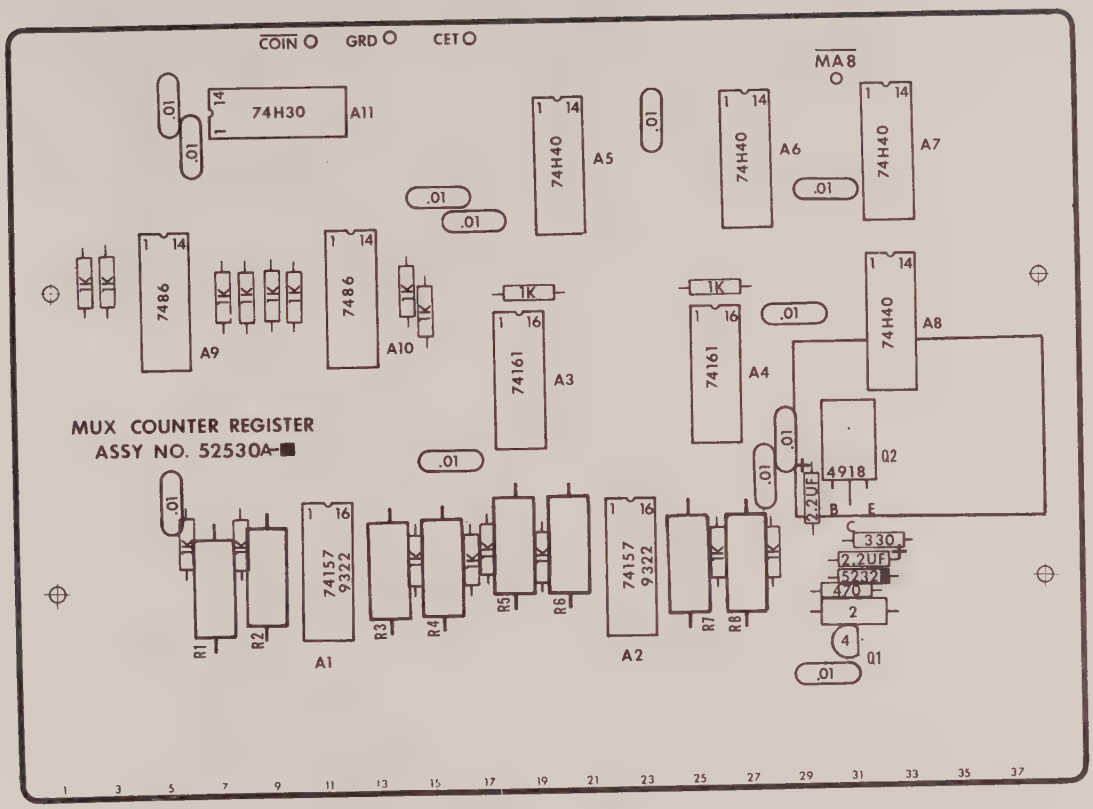
FINISH

52525-T
NEXT ASSY

SCALE

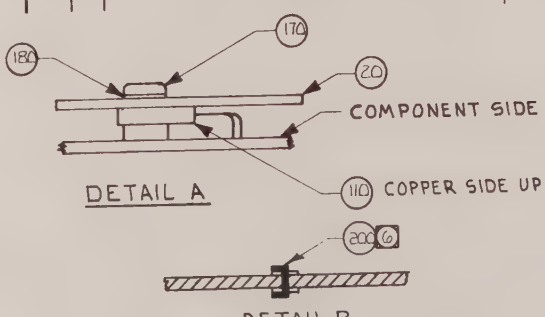
D 52526-T
SIZE CODE — SH 1 OF 1

52526-T



PRESTON SCIENTIFIC INCORPORATED Anaheim Calif				
TITLE PRINTED CIRCUIT ASSY MUX COUNTER REGISTER				52530-T
MATERIAL				SIZE
FINISH				CODE
SCALE 2/1				SH 1 OF 3
BY	DATE			
DRAWN M.J. STEM	2-14-73			
CHK	2-16-73			
ENGR	2-19-73			
APPD				
APPD				
ABBREVIATIONS PER MIL-STD-22				

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
		SEE SHEET ONE		



DETAIL A

DETAIL B

TABULATION	
DASH NO.	R1-R8 VALUE
52530-00	OMIT

7 FOR R1 THRU R8 VALUE, SEE TABULATION.
6 INSTALL WIRE (ITEM 200) IN HOLES WITH CIRCUITRY ON COMPONENT SIDE & SOLDER BOTH SIDES SEE DETAIL "B"
5 FOR HEAT SINK ASSY, SEE DETAIL "A"
4. ALL CAPACITORS ARE IN UF.
3. ALL RESISTORS ARE 1/4 W, 10%.
2. FOR P/L SEE SH. 3 OF 3
1. FOR SCHEMATIC DIAGRAM SEE DWG. NO 52531-T

NOTES: UNLESS OTHERWISE SPECIFIED

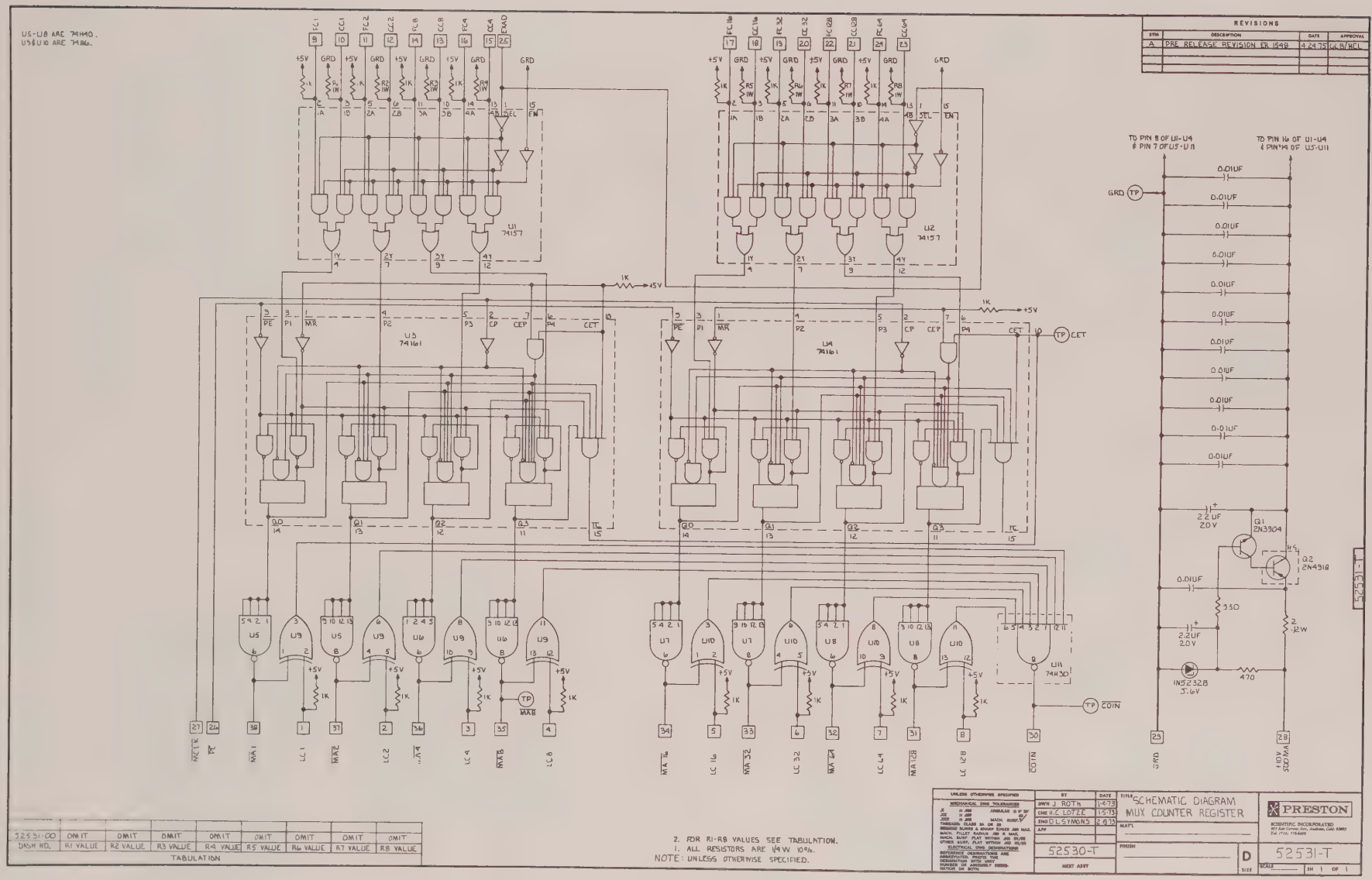
BY	DATE	TITLE PRINTED CIRCUIT ASSY MUX COUNTER REGISTER	PRESTON SCIENTIFIC INCORPORATED
DRAWN M.J. STEM	2-14-73		
CHK	2-16-73		
ENGR	2-19-73	MATERIAL	
APPD			
APPD		FINISH	A 52530-T
NEXT ASSY		SCALE	SIZE CODE SH 2 OF 3
59830			

TITLE: P.C. ASSY MUX COUNTER REG
DWG NO. 52530-00 REV A
SHEET 3 OF 3

PRESTON SCIENTIFIC INC.
PRINTED 2/20/73

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	52533-00	D&R ASSY MUX COUNTER REG	C
020	1	46079-00	HEATSINK	A
030	1	528-00	RESISTOR 1/4W 10% 330	
040	1	529-00	RESISTOR 1/4W 10% 470	
050	18	531-00	RESISTOR 1/4W 10% 1K	
060	1	558-06	RESISTOR 1/2W 5% 2	
070	12	93-01	CAPACITOR .01UF	
080	2	131-00	CAPACITOR 2.2UF 20V	
090	1	244-08	DIODE ZENER 1N5232B	
100	1	846-00	TRANSISTOR 2N3904	
110	1	846-10	TRANSISTOR 2N4918	
120	2	848-60	INTEGRATED CIRCUIT 7486	
130	1	848-09	INTEGRATED CIRCUIT 74H30	
140	4	848 12	INTEGRATED CIRCUIT 74H40	
150	2	848-58	INTEGRATED CIRCUIT 74157	
160	2	848-59	INTEGRATED CIRCUIT 74161	
170	1	665-00	SCREW PHMS 4-40 X 5/16	
180	1	859-02	WASHER SHOULDER NYLON	
190	A/R	904-00	SILICONE GREASE	
200	A/R	989-00	WIRE 22 AWG	



REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	PRE RELEASE REVISION ER 1548	4.24.75	GCB/HCL

52531-00	OMIT	OMIT	OMIT	OMIT	OMIT	OMIT	OMIT	OMIT
DASH NO.	R1 VALUE	R2 VALUE	R3 VALUE	R4 VALUE	R5 VALUE	R6 VALUE	R7 VALUE	R8 VALUE

TABULATION

2. FOR R1-R8 VALUES SEE TABULATION.
1. ALL RESISTORS ARE 1/4W 10%.
NOTE: UNLESS OTHERWISE SPECIFIED.

UNLESS OTHERWISE SPECIFIED
MECHANICAL DWG TOLERANCES
.X ±.030 ANGULAR ±0° 30'
.XX ±.010 MACH. SURF. 63
.XXX ±.005
THREADS CLASS 2A OR 2B
BREAKS SLOPES & SHARP EDGES .005 MAX.
MACH. FILLET RADIUS .010 ± MAX.
MACH. SURF. FLAT WITHIN .005 IN/IN
OTHER SURF. FLAT WITHIN .005 IN/IN
ELECTRICAL DWG DESIGNATIONS
REFERENCE DESIGNATIONS ARE ASSIGNED TO PRINTED DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION ON BOTH.

	BY	DATE
DWN	J ROTH	1-4-73
CHK	H.C LOTZE	1-5-73
ENG	O L SYMONS	2-8-73
APP		

52530-T
NEXT ASSY

TITLE SCHEMATIC DIAGRAM MUX COUNTER REGISTER

MAT'L

FINISH

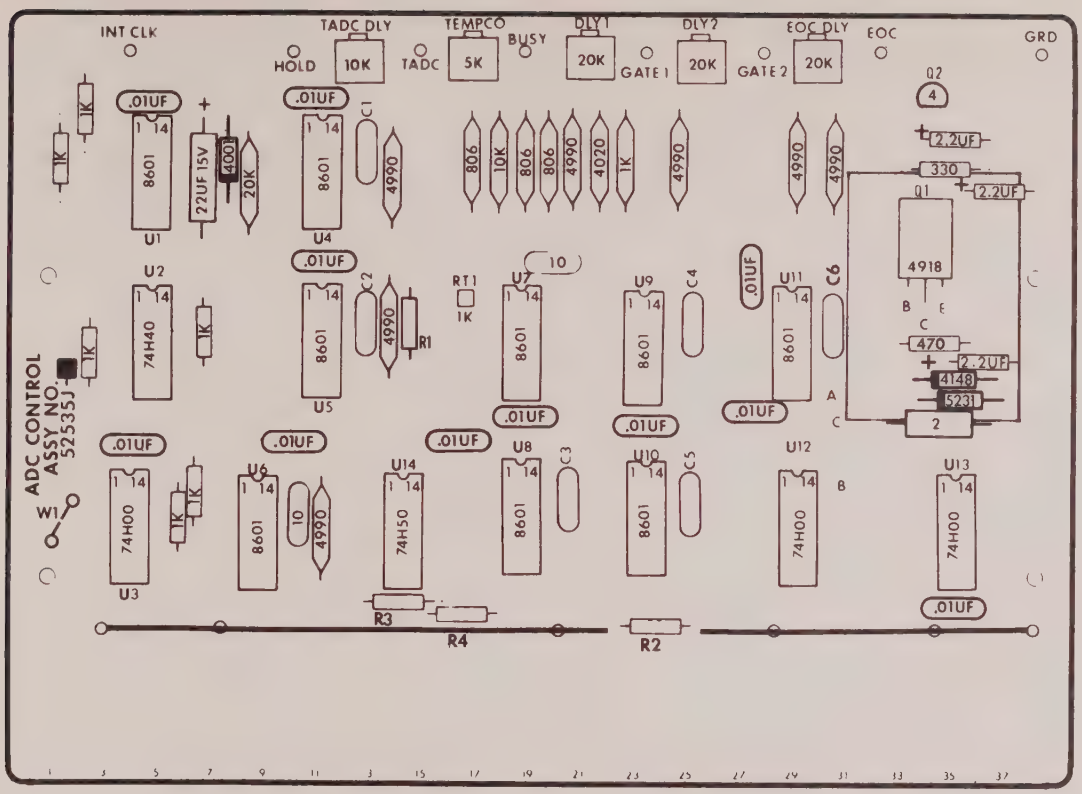
D
SIZE

PRESTON
SCIENTIFIC INCORPORATED
1073 East Gorham Ave., Madison, Calif. 53603
Tel. (716) 776-6400

52531-T

SCALE

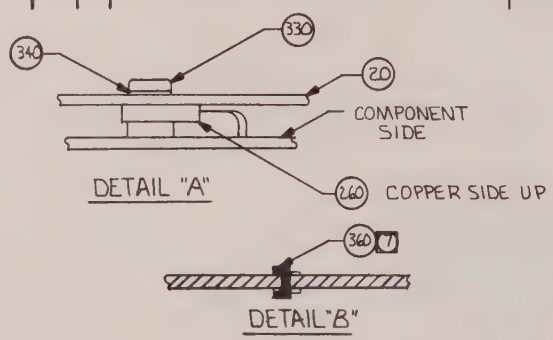
SH 1 OF 1



PRESTON SCIENTIFIC INCORPORATED	52535-T
TITLE: PRINTED CIRCUIT ASSY ADC CONTROL	SH 1 OF 4
MATERIAL	SIZE
FINISH	CODE
SCALE 2/1	
DRAWN WNC 1-31-73	
CHK	
ENGR	
APPD	
APPD	
ABBREVIATIONS PER MIL-STD-12	

52535-T

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
		SEE SHEET ONE		



DETAIL "A"

DETAIL "B"

9. ALL CAPACITORS ARE IN PF
8. FOR HEAT SINK ASSY SEE DETAIL "A".
7. INSTALL WIRE (ITEM 360) IN HOLES WITH CIRCUITRY ON COMPONENT SIDE & SOLDER BOTH SIDES PER DETAIL "B".
6. FOR PARTS LIST SEE SH 4 OF 4.
5. FOR R1-R4, W1 & A,B, & C WIRING & C6 SEE TABULATION SH. 3 OF 4.
4. C3-C5 TO BE SELECTED PER CHART SEE SH 3 OF 4.
3. C1 & C2 TO BE SELECTED IN TEST.
2. ALL RESISTORS ARE 1/4W 10%.
1. FOR SCHEMATIC DIAGRAM SEE DWG NO. 52536-T.

NOTE: UNLESS OTHERWISE SPECIFIED

BY	DATE
DRAWN WNC 1-31-73	1-31-73
CHK	2-1-73
ENGR	2-19-73
APPD	
APPD	

TITLE: PRINTED CIRCUIT ASSY ADC CONTROL

MATERIAL

FINISH

SCALE

PRESTON SCIENTIFIC INCORPORATED
805 East Corritos Ave., Anaheim, Calif 92805
Tel. (714) 776-6400

A — SIZE

52535-T

CODE — SH 2 OF 4

DELAY SPAN CODE FOR C3-C5		
C3 THRU C5		DELAY SPAN IN N.S.
VALUE	PART NO.	
10 PF	52-01	70 - 220
22 PF	55-01	100 - 350
47 PF	58-01	160 - 600
100 PF	61-01	260 - 1,000
220 PF	66-00	500 - 2,000
470 PF	72-01	1,000 - 4,200
1000 PF	76-02	1,900 - 8,000
.0022 UF	98-00	4,500 - 20,000
.0047 UF	87-00	9,000 - 37,500

TABULATION

DASH NO	WIRE FROM-TO	R1 VALUE	W1	C6	R2-R4 VALUE
52535-00	C-B	OMIT	INSTALL	22 PF	33 Ω
52535-01	A-B	OMIT	INSTALL	22 PF	
52535-02	C-B	1K	INSTALL	22 PF	
52535-03	C-B	OMIT	OMIT	22 PF	
52535-04	C-B	OMIT	INSTALL	47 PF	
52535-05	C-B	OMIT	INSTALL	330 PF	33 Ω
52535-06	C-B	OMIT	INSTALL	47 PF	STRAP

PRESTON SCIENTIFIC INCORPORATED Anaheim, Calif.

PRINTED CIRCUIT ASSY ADC CONTROL

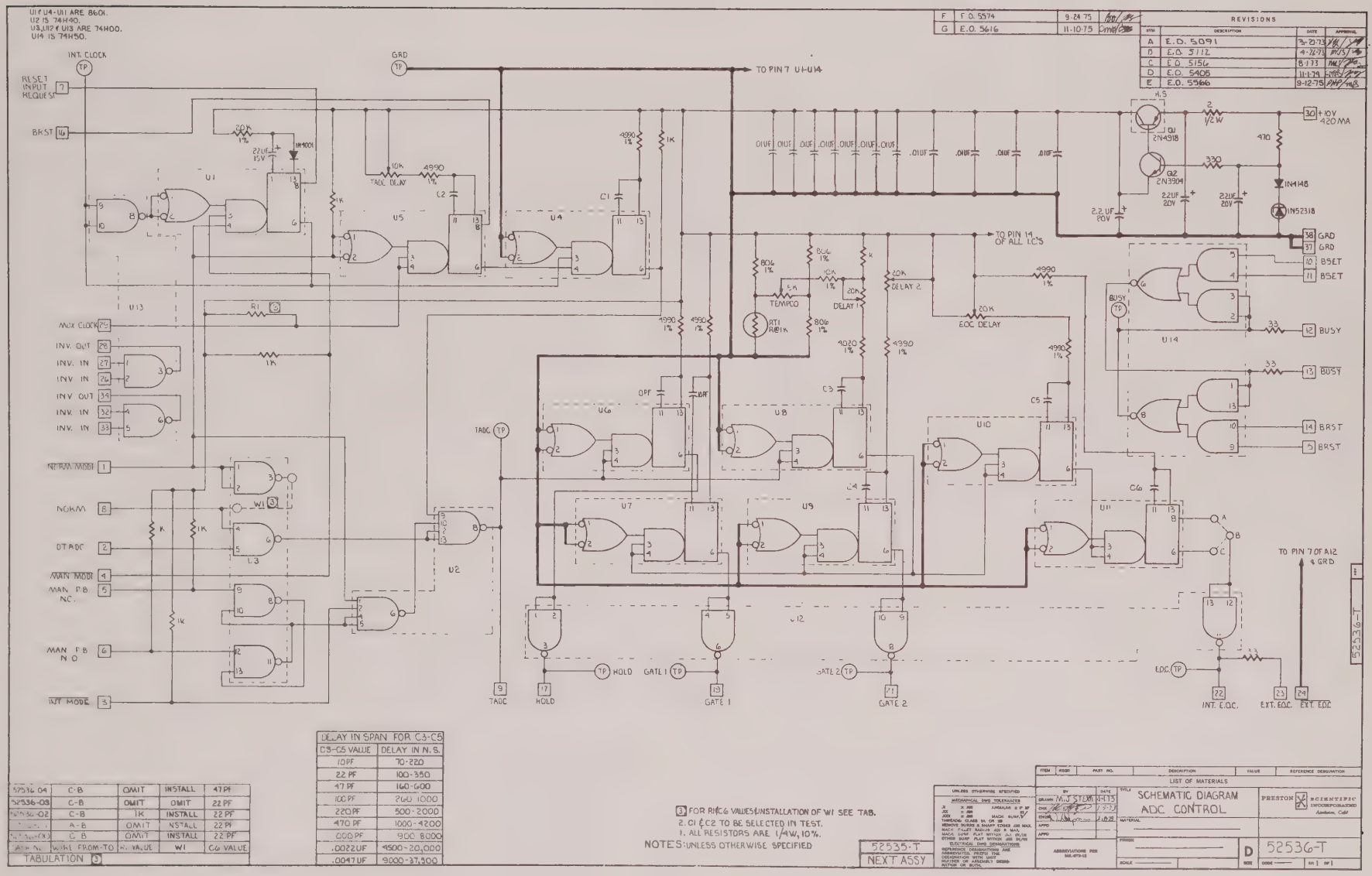
52535-T

CODE — SH 3 OF 4

TITLE: P.C. ASSY ADC CONTROL PRESTON SCIENTIFIC INC.
DWG NO. 52535-02 REV [illegible] PRINTED 9/25/75
SHEET [illegible]

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION		
010	1	52538-00	D&R ASSY ADC CONTROL		[illegible]
020	1	46079-00	HEATSINK		A
030	3	522-00	RESISTOR 1/4W	10%	33
040	1	528-00	RESISTOR 1/4W	10%	[illegible]
050	1	529-00	RESISTOR 1/4W	10%	[illegible]
060	2	531-00	RESISTOR 1/4W	10%	1K
070	3	408-00	RESISTOR 1/4W	1%	806
080	1	409-00	RESISTOR 1/4W	1%	1K
090	1	440-00	RESISTOR 1/4W	1%	4020
100	2	445-00	RESISTOR 1/4W	1%	4990
110	1	456-03	RESISTOR 1/4W	1%	10K
120	1	465-02	RESISTOR 1/4W	1%	20K
130	1	558-06	RESISTOR 1/2W	5%	2
140	1	351-80	POTENTIOMETER		5K
150	1	358-80	POTENTIOMETER		10K
160	3	360-03	POTENTIOMETER		20K
170	2	52-01	CAPACITOR	5%	10PF
180	1	[illegible]	CAPACITOR	5%	22PF
190	11	93-01	CAPACITOR	10%	.01UF
200	3	131-00	CAPACITOR	20%	2.2UF 20V
210	1	144-00	CAPACITOR	20%	22UF 15V
220	1	244-01	DIODE		1N4001
230	1	[illegible]	DIODE		1N4148
240	1	248-06	DIODE ZENER		1N5231B
250	1	846-00	TRANSISTOR		2N3904
260	1	846-10	TRANSISTOR		2N4918
270	1	374-04	THERMISTOR		1K
280	3	848-14	INTEGRATED CIRCUIT		74H00
290	1	848-12	INTEGRATED CIRCUIT		74H40
300	1	848-24	INTEGRATED CIRCUIT		74H50
310	19	848-98	INTEGRATED CIRCUIT		8601
320	A/R	994-11	WIRE 22 AWG		
330	1	665-00	SCREW PHMS 4-40 X 5/16		
340	1	859-02	WASHER SHOULDER NYLON		
350	A/R	904-00	SILICONE GREASE		
360	A/R	989-00	WIRE 22 AWG		
370	A/R	994-11	WIRE 22 AWG		



REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	E.O. 5091	3-27-73	
B	E.O. 5112	4-24-73	
C	E.O. 5156	8-1-73	
D	E.O. 5405	11-1-74	
E	E.O. 5566	9-12-75	
F	E.O. 5574	9-24-75	
G	E.O. 5616	11-10-75	

DELAY IN SPAN FOR C3-C5	
C3-C5 VALUE	DELAY IN N.S.
10 PF	70-220
22 PF	100-350
47 PF	140-600
100 PF	260-1000
220 PF	500-2000
470 PF	1000-4200
000 PF	900-8000
.0022 UF	4500-20,000
.0047 UF	9000-37,500

52536-04	C-B	OMIT	INSTALL	47 PF
52536-03	C-B	OMIT	OMIT	22 PF
52536-02	C-B	1K	INSTALL	22 PF
[illegible]	A-B	OMIT	INSTALL	22 PF
52536-01	C-B	OMIT	INSTALL	22 PF
ASSY NO.	WIRE FROM-TO	R1 VALUE	W1	C6 VALUE
TABULATION 3				

3 FOR R1 & C6 VALUES/INSTALLATION OF W1 SEE TAB.
2. C1 & C2 TO BE SELECTED IN TEST.
1. ALL RESISTORS ARE 1/4W, 10%.
NOTES: UNLESS OTHERWISE SPECIFIED

52535-T
NEXT ASSY

ITEM	REQD	PART NO.	DESCRIPTION	VALUE	REFERENCE DESIGNATION

LIST OF MATERIALS

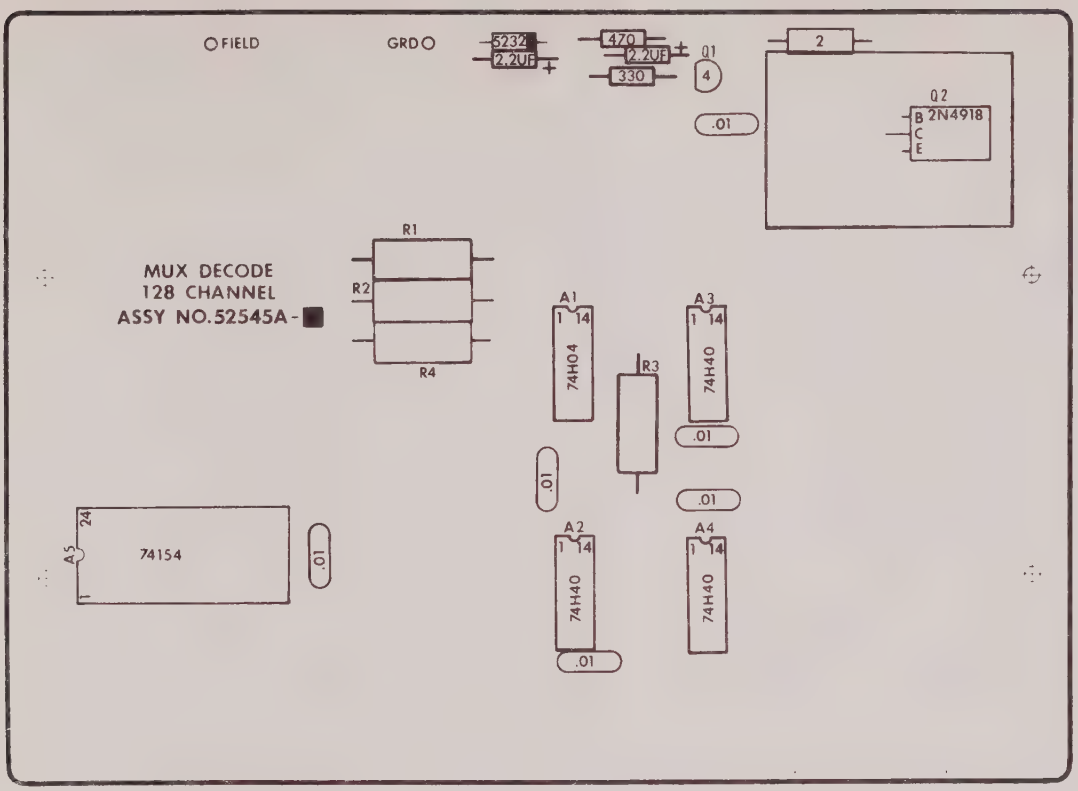
UNLESS OTHERWISE SPECIFIED
MECHANICAL DWG TOLERANCES
ABBREVIATIONS PER MIL-STD-12D
REFERENCE DESIGNATIONS ARE ABBREVIATED PREFIX (PER DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH)

	BY	DATE
DRAWN	M.J. STEIN	8-9-73
CHK		
ENGR		2-10-72
APPD		
APPD		

TITLE: SCHEMATIC DIAGRAM ADC CONTROL
MATERIAL
FINISH
SCALE

PRESTON SCIENTIFIC INCORPORATED Anaheim, Calif

SIZE D | CODE | 52536-T | SH 1 OF 1



PRESTON SCIENTIFIC INCORPORATED

52545-T

SH OF 3

CODE

SIZE

TITLE PRINTED CIRCUIT ASSY MUX DECODE 128 CHAN

MATERIAL

FINISH

SCALE

DATE 1-18-73

BY

DRAWN WNK.n

CHK

ENGR

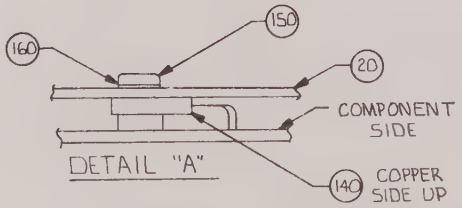
APPD

APPD

ABBREVIATIONS PER MIL-STD-12

52545-T

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



TABULATION				
DASH NO.	R1 VALUE	R2 VALUE	R3 VALUE	R4 VALUE
52545-00	OMIT	OMIT	OMIT	OMIT

5. FOR R1-R4 VALUE SEE TABULATION.
4. FOR PARTS LIST SEE SH 3 OF 3.
3. FOR HEAT SINK ASSY SEE DETAIL "A".
2. ALL RESISTORS ARE 1/4W 10%.
1. FOR SCHEMATIC SEE DWG NO. 52546-T.

NOTE: UNLESS OTHERWISE SPECIFIED

BY	DATE
DRAWN WNK.n	1-19-73
CHK	1-19-73
ENGR	2-19-73
APPD	
APPD	

TITLE PRINTED CIRCUIT ASSY MUX DECODE 128 CHAN

MATERIAL

FINISH

SCALE

SIZE A

CODE

SH 2 OF 3

NEXT ASSY

PRESTON

SCIENTIFIC INCORPORATED
805 East Corridor Ave., Anaheim, Calif 92805
Tel (714) 776-6400

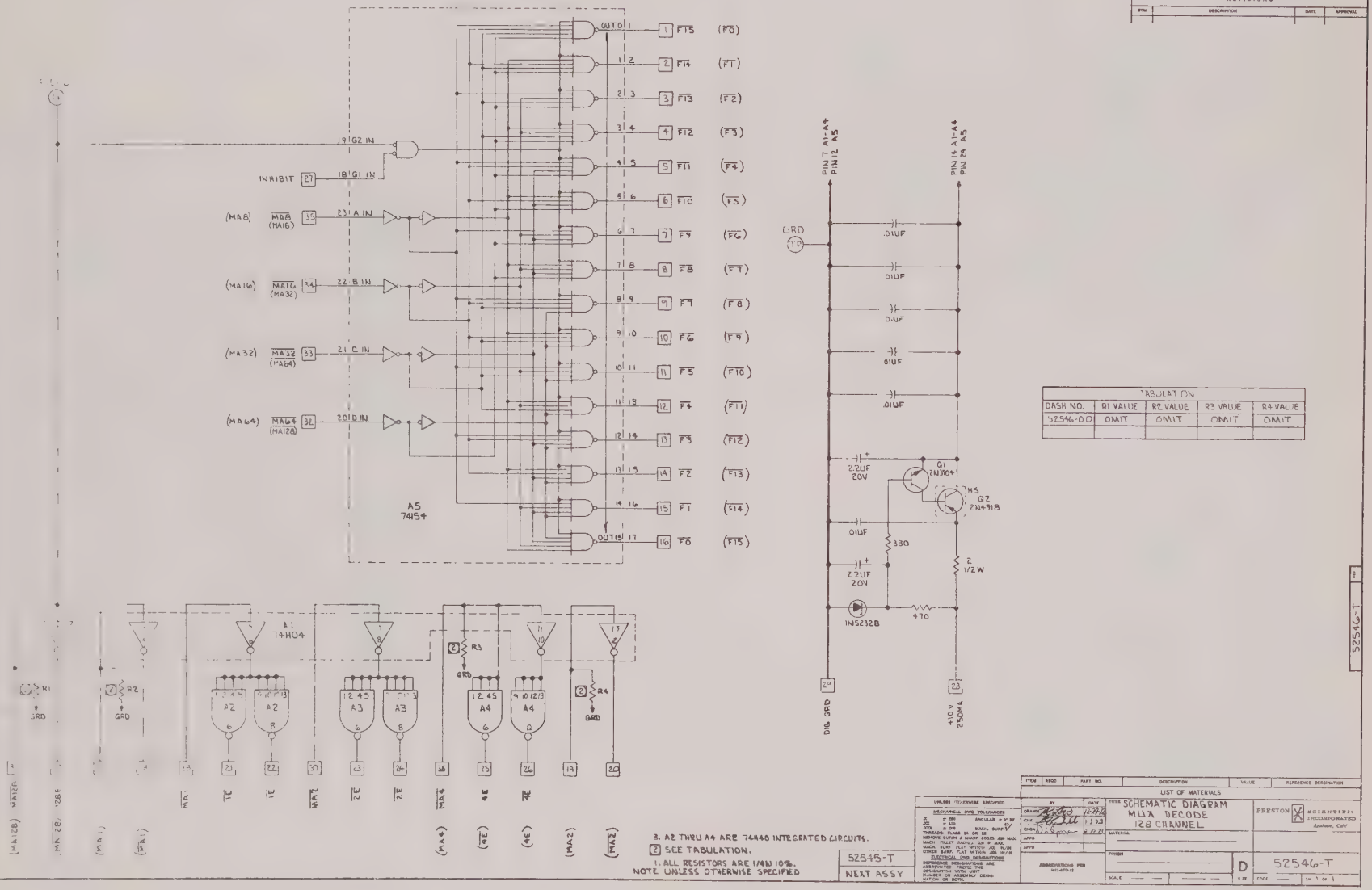
52545-T

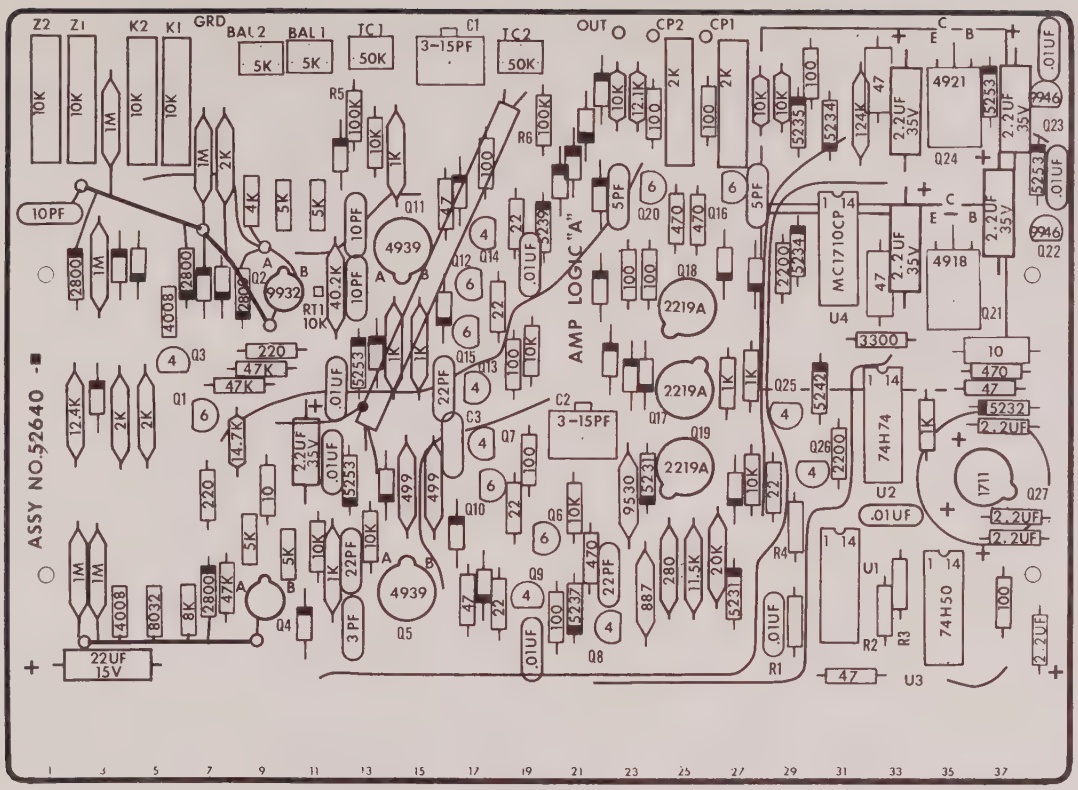
TITLE: P.C. ASSY MUX DECODE 128 CHAN
DWG NO. 52545-00 REV 4
SHEET 3 OF 3

PRESTON SCIENTIFIC INC.
PRINTED 4/20/73

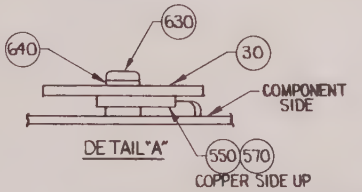
PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	52548-00	D&R ASSY MUX DECODE 128 CHAN	C
020	1	46079-00	HEATSINK	A
030	1	528-00	RESISTOR 1/4W 10%	330
040	1	529-00	RESISTOR 1/4W 10%	470
050	1	558-06	RESISTOR 1/2W 5%	2
070	2	131-00	CAPACITOR 20%	2.2UF 20V
080	6	93-01	CAPACITOR 10%	.01UF
090	1	244-08	DIODE ZENER	1N5232B
100	1	848-15	INTEGRATED CIRCUIT	74154
110	1	848-40	INTEGRATED CIRCUIT	74H04
120	3	848-12	INTEGRATED CIRCUIT	74H40
130	1	846-00	TRANSISTOR	2N3904
140	1	846-10	TRANSISTOR	2N4918
150	1	665-00	SCREW PHMS 4-40 X 5/16	
160	1	859-02	WASHER SHOULDER NYLON	

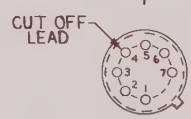

REVISIONS
A5
74154
19 G2 IN
INHIBIT
18 G1 IN
23 A IN
22 B IN
21 C IN
20 D IN
OUT 0
OUT 15
F15 (F0)
F14 (F1)
F13 (F2)
F12 (F3)
F11 (F4)
F10 (F5)
F9 (F6)
F8 (F7)
F7 (F8)
F6 (F9)
F5 (F10)
F4 (F11)
F3 (F12)
F2 (F13)
F1 (F14)
F0 (F15)
PIN 7 A1-A4
PIN 12 A5
PIN 14 A1-A4
PIN 24 A5
GRD
.01UF
.01UF
.1UF
.01UF
.01UF
2.2UF 20V
Q1 2N3904
MS
Q2 2N4918
.01UF
330
2 1/2 W
2.2UF 20V
470
IN5232B
DIN GRD
+10V 250MA
A1 74H04
A2 74H40
A3 74H40
A4 74H40
R1
R2
R3
R4
GRD
(MA128)
(MA64)
(MA32)
(MA16)
(MA8)
(MA4)
(MA2)
(MA1)
WRITE
1E
1E
WR1
2E
2E
WR2
4E
4E
8E
(MA4)
(4E)
(4E)
(MA2)
(WR2)
3. A2 THRU A4 ARE 74H40 INTEGRATED CIRCUITS.
2 SEE TABULATION.
1. ALL RESISTORS ARE 1/4W 10%.
NOTE UNLESS OTHERWISE SPECIFIED
52545-T
NEXT ASSY
TABULATION
DASH NO. | R1 VALUE | R2 VALUE | R3 VALUE | R4 VALUE
52546-00 | OMIT | OMIT | OMIT | OMIT
ITEM | QTY | PART NO. | DESCRIPTION | VALUE | REFERENCE DESIGNATION
LIST OF MATERIALS
SCHEMATIC DIAGRAM
MUX DECODE
128 CHANNEL
PRESTON SCIENTIFIC INCORPORATED
Anaheim, Calif
52546-T
D
52546-T



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
		SEE SHEET ONE		



DETAIL "A"



DETAIL "B" [10]
BOTTOM VIEW

TABULATION						
DASH NO.	USE	U1	R1 & R2	R3 & R4	Q4	C3
52640-00	STD	74H40	33Ω MAX	OPEN	9932	OMIT
52640-01	OPEN COLL	74H22	JUMPER	270Ω MIN	9932	OMIT
52640-02	50Ω LOAD	74S140	JUMPER	OPEN	9932	OMIT
52640-10	STD	74H40	33Ω	OPEN	2N5912	22PF
52640-11	OPEN COLL	74H22	JUMPER	270Ω MIN	2N5912	22PF
52640-12	50Ω LOAD	74S140	JUMPER	OPEN	2N5912	22PF

[10] CUT OFF PIN 4 OF Q4 WHEN Q4 IS 5912 AS SHOWN IN DETAIL "B".
9. R5 & R6 ARE IN NOMINAL VALUE, ACTUAL VALUE TO BE SELECTED IN TEST.
8. INSTALL HEATSINK (ITEM 20) ON Q27 USING SILICONE GREASE (ITEM 660).
7. FOR R1-R4, U1, Q4 & C3 VALUES SEE TABULATION.
6. INSTALL WIRE (ITEM 650) IN HOLES WITH CIRCUITRY ON COMPONENT SIDE & SOLDER BOTH SIDES WHERE APPLICABLE.
5. FOR HEATSINK ASSY SEE DETAIL "A".
4. ALL DIODES ARE IN4148.
3. ALL RESISTORS ARE 1/4W, 10%.
2. FOR PARTS LIST SEE SH. 3 & 4 OF 4.
1. FOR SCHEMATIC DIAGRAM SEE DWG. NO. 52641-T.

NOTE: UNLESS OTHERWISE SPECIFIED

BY	DATE	TITLE	
DRAWN P Parker	12-5-75	PRINTED CIRCUIT ASSY AMP LOGIC "A"	PRESTON SCIENTIFIC INCORPORATED
CHK [signature]	12-5-75	MATERIAL	
ENGR [signature]	12-5-75	FINISH	
APPD		SCALE	A SIZE
APPD			52640-T
NEXT ASSY			CODE SH 2 OF 4

BY	DATE	TITLE	
DRAWN P Parker	12-5-75	PRINTED CIRCUIT ASSY AMP LOGIC "A"	PRESTON SCIENTIFIC INCORPORATED
CHK [signature]	12-5-75	MATERIAL	
ENGR [signature]	12-5-75	FINISH	
APPD		SCALE	2/1
APPD			B SIZE
ABBREVIATIONS PER MIL-STD-80			52640-T CODE SH 1 OF 4

MASTER # 56

TITLE: P.C. ASSY AMP LOGIC A
DWG NO. 52640-00 REV _____
SHEET 3 OF 4

PRESTON SCIENTIFIC INC.
PRINTED 12/05/75

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION			
010	1	52643-00	D&R ASSY AMP LOGIC A			C
020	1	284-01	HEAT SINK			
030	2	46079-00	HEATSINK			A
050	1	520-00	RESISTOR 1/4W 10%		10	
060	5	521-00	RESISTOR 1/4W 10%		22	
070	2	522-00	RESISTOR 1/4W 10%		33	
080	4	523-00	RESISTOR 1/4W 10%		47	
090	10	525-00	RESISTOR 1/4W 10%		100	
100	2	527-00	RESISTOR 1/4W 10%		220	
110	4	529-00	RESISTOR 1/4W 10%		470	
120	3	531-00	RESISTOR 1/4W 10%		1K	
130	2	533-00	RESISTOR 1/4W 10%		2200	
140	1	535-00	RESISTOR 1/4W 10%		3300	
150	6	538-00	RESISTOR 1/4W 10%		10K	
170	3	544-00	RESISTOR 1/4W 10%		47K	
180	2	547-00	RESISTOR 1/4W 10%		100K	
190	3	390-05	RESISTOR 1/8W 1%		10K	
192	1	390-15	RESISTOR 1/8W 1%		12.1K	
195	1	390-19	RESISTOR 1/8W 1%		14.7K	
200	1	401-28	RESISTOR 1/4W 1%		280	
205	2	402-02	RESISTOR 1/4W 1%		499	
210	1	408-03	RESISTOR 1/4W 1%		887	
215	1	455-01	RESISTOR 1/4W 1%		9530	
220	4	409-00	RESISTOR 1/4W 1%		1K	
240	3	422-00	RESISTOR 1/4W 1%		2K	
260	1	458-01	RESISTOR 1/4W 1%		11.5K	
270	1	459-00	RESISTOR 1/4W 1%		12.4K	
280	1	465-02	RESISTOR 1/4W 1%		20K	
285	1	471-03	RESISTOR 1/4W 1%		40.2K	
295	1	477-25	RESISTOR 1/4W 1%		124K	
300	5	488-16	RESISTOR 1/4W 1%		1M	
302	1	560-00	RESISTOR 1/2W 10%		10	
305	2	563-00	RESISTOR 1/2W 10%		47	
310	2	347-01	POTENTIOMETER		2K	
315	2	351 80	POTENTIOMETER		5K	
320	4	359 03	POTENTIOMETER		10K	
322	2	369 02	POTENTIOMETER		50K	
325	1	998-39	RESISTOR	.02%	4K	
330	2	998 40	RESISTOR	.02%	4008	
340	4	999-49	RESISTOR	.02%	5K	
350	1	998-47	RESISTOR	.02%	8K	
360	1	999-71	RESISTOR	.02%	80K	
365	1	374-05	THERMISTOR		10K	
370	1	48 00	CAPACITOR		3PF	
375	2	50-01	CAPACITOR		5PF	
380	3	52-01	CAPACITOR	5%	10PF	
385	3	55-01	CAPACITOR	5%	22PF	
400	2	78-01	CAPACITOR TRIMMER		5-15PF	
410	8	93-01	CAPACITOR	10%	.01UF	
420	4	131 00	CAPACITOR	20%	2.2UF 20V	

TITLE: P.C. ASSY AMP LOGIC A
DWG NO. 52640-00 REV _____
SHEET 4 OF 4

PRESTON SCIENTIFIC INC.
PRINTED 12/05/75

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION			
430	5	133-00	CAPACITOR	20%	2.2UF 35V	
435	1	144-00	CAPACITOR	20%	22UF 15V	
436	1	234-02	DIODE ZENER		1N5235B	
438	1	235-01	DIODE ZENER		1N5239B	
440	1	237-00	DIODE ZENER		1N5242B	
450	25	239-00	DIODE		1N4148	
460	1	244-08	DIODE ZENER		1N5232B	
470	2	248-06	DIODE ZENER		1N5231B	
480	2	248-08	DIODE ZENER		1N5234B	
500	1	248-14	DIODE ZENER		1N5237B	
510	4	248-20	DIODE ZENER		1N5253B	
515	4	248-27	DIODE		5082-2800	
520	1	828-00	TRANSISTOR		2N1711	
530	8	846-00	TRANSISTOR		2N3904	
540	7	846-01	TRANSISTOR		2N3906	
550	1	846-03	TRANSISTOR		2N4921	
560	2	846-08	TRANSISTOR		2N4939	
570	1	846-10	TRANSISTOR		2N4918	
575	3	830-02	TRANSISTOR		2N2219A	
580	2	845-05	TRANSISTOR SELECTED		9932	
590	2	9946-00	TRANSISTOR SELECT			A
600	1	848-12	INTEGRATED CIRCUIT		74H40	
610	1	848-24	INTEGRATED CIRCUIT		74H50	
620	1	848-77	INTEGRATED CIRCUIT		74H74	
625	1	848-65	INTEGRATED CIRCUIT		MC1710CP	
630	2	665-00	SCREW PHMS 4-40 X 5/16			
640	2	859-00	WASHER SHOULDER #4 NYLON			
650	A/R	989-00	WIRE 22 AWG			
655	A/R	994-11	WIRE 22 AWG			
660	A/R	904-00	SILICONE GREASE			
670	A/R	994-29	CABLE 24 AWG			

TITLE: P.C. ASSY AMP LOGIC A
DWG NO. 52640-10 REV --
SHEET 3 OF 4

PRESTON SCIENTIFIC INC.
PRINTED 12/05/75

PARTS LIST

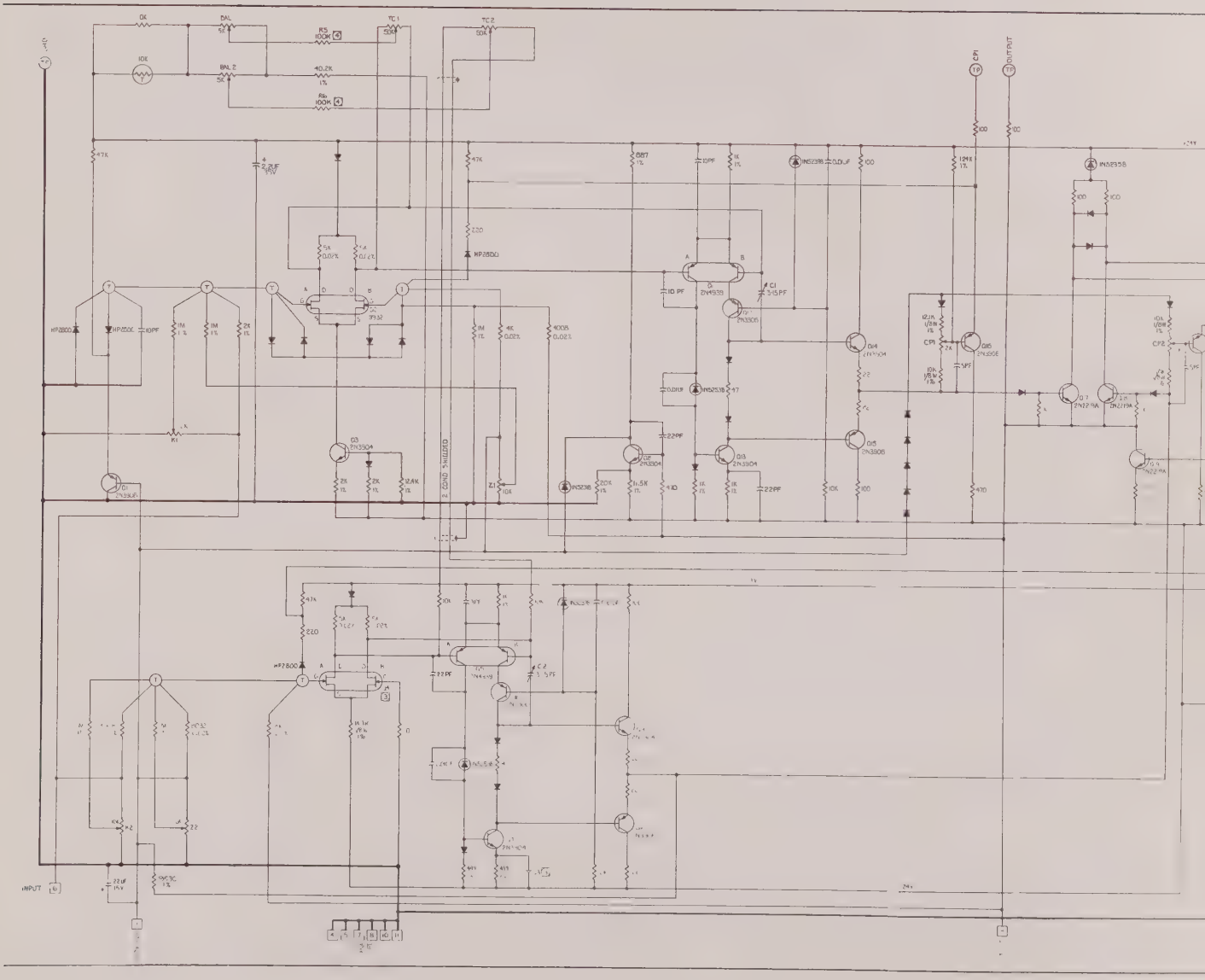
ITEM	QTY	PART NO.	DESCRIPTION			
010	1	52643-00	D&R ASSY AMP LOGIC A			C
020	1	284-01	HEAT SINK			
030	2	46079-00	HEATSINK			A
050	1	520-00	RESISTOR 1/4W 10%		10	
060	5	521-00	RESISTOR 1/4W 10%		22	
070	2	522-00	RESISTOR 1/4W 10%		33	
080	4	523-00	RESISTOR 1/4W 10%		47	
090	10	525-00	RESISTOR 1/4W 10%		100	
100	2	527-00	RESISTOR 1/4W 10%		220	
110	4	529-00	RESISTOR 1/4W 10%		470	
120	3	531-00	RESISTOR 1/4W 10%		1K	
130	2	533-00	RESISTOR 1/4W 10%		2200	
140	1	535-00	RESISTOR 1/4W 10%		3300	
150	6	538-00	RESISTOR 1/4W 10%		10K	
170	3	544 00	RESISTOR 1/4W 10%		47K	
180	2	547-00	RESISTOR 1/4W 10%		100K	
190	3	390-05	RESISTOR 1/8W 1%		10K	
192	1	390-15	RESISTOR 1/8W 1%		12.1K	
195	1	390-19	RESISTOR 1/8W 1%		14.7K	
200	1	401-28	RESISTOR 1/4W 1%		280	
205	2	402 02	RESISTOR 1/4W 1%		499	
210	1	408-03	RESISTOR 1/4W 1%		887	
215	1	455-01	RESISTOR 1/4W 1%		9530	
220	4	409 00	RESISTOR 1/4W 1%		1K	
240	3	422-00	RESISTOR 1/4W 1%		2K	
260	1	458-01	RESISTOR 1/4W 1%		11.5K	
270	1	459-00	RESISTOR 1/4W 1%		12.4K	
280	1	465-02	RESISTOR 1/4W 1%		20K	
285	1	471-03	RESISTOR 1/4W 1%		40.2K	
295	1	477-25	RESISTOR 1/4W 1%		124K	
300	5	488 16	RESISTOR 1/4W 1%		1M	
302	1	560-00	RESISTOR 1/2W 10%		10	
305	2	563 00	RESISTOR 1/2W 10%		47	
310	2	347 01	POTENTIOMETER		2K	
315	2	351 80	POTENTIOMETER		5K	
320	4	359-03	POTENTIOMETER		10K	
322	2	369-02	POTENTIOMETER		50K	
325	1	998-39	RESISTOR	.02%	4K	
330	2	998-40	RESISTOR	.02%	4008	
340	4	999-49	RESISTOR	.02%	5K	
350	1	998-47	RESISTOR	.02%	8K	
360	1	999-71	RESISTOR	.02%	80K	
365	1	374-05	THERMISTOR		10K	
370	1	48 00	CAPACITOR		3PF	
375	2	50 01	CAPACITOR		5PF	
380	3	52 01	CAPACITOR	5%	10PF	
385	4	55 01	CAPACITOR	5%	22PF	
400	2	78-01	CAPACITOR TRIMMER		5-15PF	
410	8	93-01	CAPACITOR	10%	.01UF	
420	4	131 00	CAPACITOR	20%	2.2UF 20V	

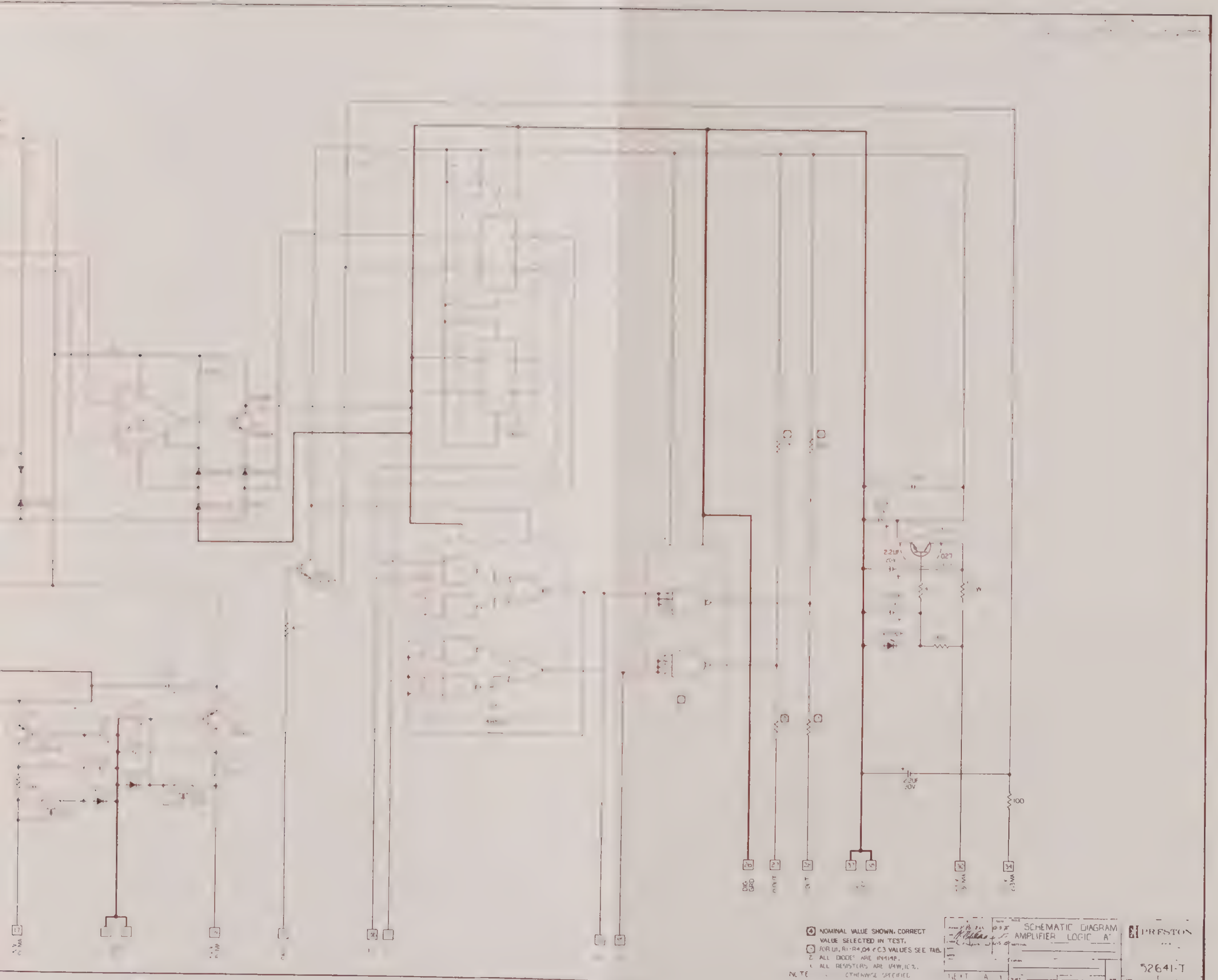
TITLE: P.C. ASSY AMP LOGIC A
DWG NO. 52640-10 REV --
SHEET 4 OF 4

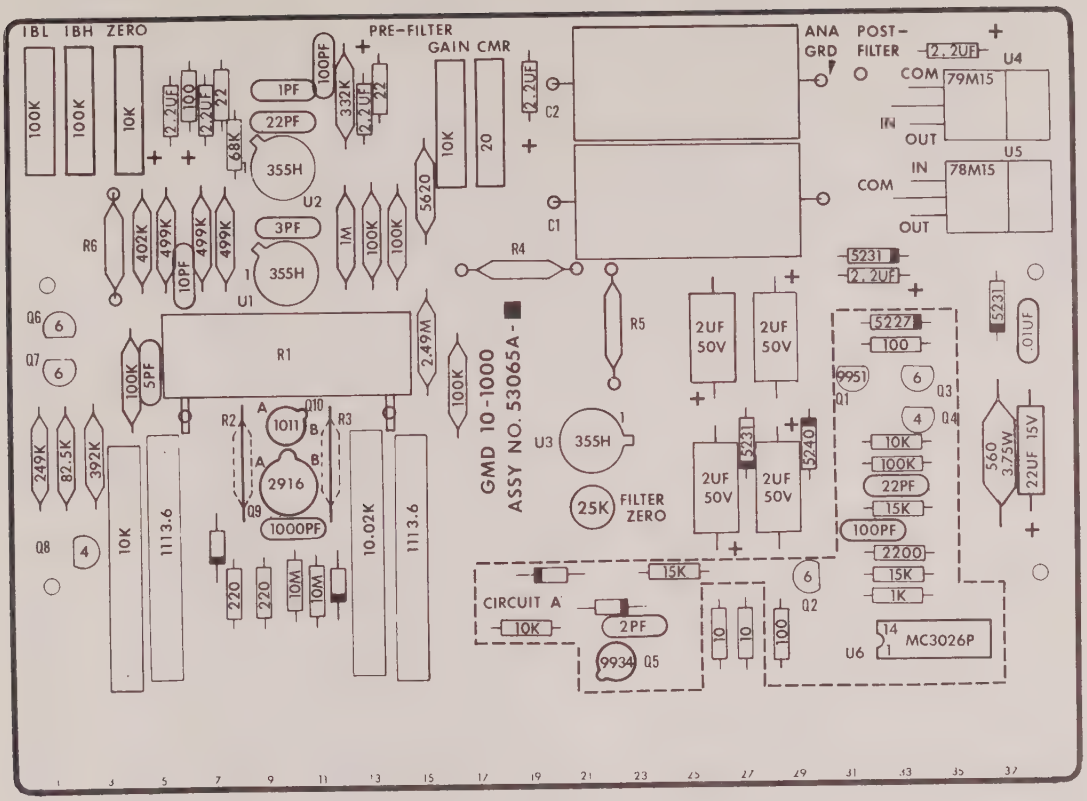
PRESTON SCIENTIFIC INC.
PRINTED 12/05/75

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION			
430	5	133-00	CAPACITOR	20%	2.2UF 35V	
435	1	144-00	CAPACITOR	20%	22UF 15V	
436	1	234-02	DIODE ZENER		1N5235B	
438	1	235-01	DIODE ZENER		1N5239B	
440	1	237-00	DIODE ZENER		1N5242B	
450	25	239-00	DIODE		1N4148	
460	1	244 08	DIODE ZENER		1N5232B	
470	2	248-06	DIODE ZENER		1N5231B	
480	2	248-08	DIODE ZENER		1N5234B	
500	1	248-14	DIODE ZENER		1N5237B	
510	4	248-20	DIODE ZENER		1N5253B	
515	4	248-27	DIODE		5082-2800	
520	1	828-00	TRANSISTOR		2N1711	
530	8	846-00	TRANSISTOR		2N3904	
540	7	846-01	TRANSISTOR		2N3906	
550	1	846-03	TRANSISTOR		2N4921	
560	2	846 08	TRANSISTOR		2N4939	
570	1	846-10	TRANSISTOR		2N4918	
575	3	830 02	TRANSISTOR		2N2219A	
580	1	845-05	TRANSISTOR SELECTED		9932	
585	1	847-19	TRANSISTOR		2N5912	
590	2	9946-00	TRANSISTOR SELECT			A
600	1	848-12	INTEGRATED CIRCUIT		74H40	
610	1	848-24	INTEGRATED CIRCUIT		74H50	
620	1	848-77	INTEGRATED CIRCUIT		74H74	
625	1	848-65	INTEGRATED CIRCUIT		MC1710CP	
630	2	665-00	SCREW PHMS 4 40 X 5/16			
640	2	859-00	WASHER SHOULDER #4 NYLON			
650	A/R	989-00	WIRE 22 AWG			
655	A/R	994-11	WIRE 22 AWG			
660	A/R	904-00	SILICONE GREASE			
670	A/R	994-29	CABLE 24 AWG			




2.2UF
.027
.22UF
20V
100
NOMINAL VALUE SHOWN. CORRECT VALUE SELECTED IN TEST.
FOR U1, R1-R4, Q4 & C3 VALUES SEE TAB.
2. ALL DIODES ARE IN4148.
ALL RESISTORS ARE 1/4W, 10%.
NOTE
OTHERWISE SPECIFIED
SCHEMATIC DIAGRAM
AMPLIFIER LOGIC A
PRESTON
52641-T



REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHEET ONE		

TABULATION									
DASH NO.	GAIN		FILTER						
	GAIN	R1 (Ω)	BW (Hz)	TYPE	U3	R4 (Ω)	R5 (Ω)	C1 & C2 (P)	CIRCUIT "A"
53065-00	10	OMIT	20K	BE	INSTALL	5360	4020	1000P	INSTALL
53065-01	100	222.22	20K	BE	INSTALL	5360	4020	1000P	INSTALL

BE : BESSEL. MAINTAINS PULSE SHAPE.
BU : BUTTERWORTH
CH : CHEBYSHEV. SHARP CUT-OFF.
NA : NOT APPLICABLE

11. INSTALL TEMPERATURE INSULATOR (ITEM 15) ON Q9 & Q10.
10. R6 TO BE SELECTED IN TEST.
9. R2 & R3 ARE TO BE INSTALLED AS WIRE STRAPS.
8. INSTALL SOCKET (ITEM 465) IN BOARD BEFORE INSTALLING Q9.
7. FOR R1, R4, R5, C1, C2, U3 & CIRCUIT "A" SEE TABULATION.
6. INSTALL WIRE (ITEM 460) IN HOLES WITH CIRCUITRY ON COMPONENT SIDE AND SOLDER BOTH SIDES WHERE APPLICABLE.
5. MOUNT U4 & U5 USING SCREW (ITEM 430) & WASHERS (ITEM 440 & 450) WITH COPPER SIDE DOWN.
4. ALL DIODES ARE IN4148.
3. ALL RESISTORS ARE 1/4W, 10%.
2. FOR PARTS LIST SEE SHEET 3 & 4 OF 4.
1. FOR SCHEMATIC DIAGRAM SEE DWG NO. 53066-T.

NOTE: UNLESS OTHERWISE SPECIFIED.

BY	DATE
DWN	7-29-76
CHK	7-31-76
ENG	8-2-76
APP	

TITLE: PRINTED CIRCUIT ASSY GMD 10-1000

MAT'L

FINISH

PRESTON SCIENTIFIC INCORPORATED
805 East Carrotos Ave., Anaheim, Calif. 92805
Tel. (714) 776-6400

58700-03 NEXT ASSY

A SIZE

53065-T

SCALE — SH 2 OF 4

58700 NEXT ASSY

PRESTON SCIENTIFIC INCORPORATED Anaheim Calif

TITLE: PRINTED CIRCUIT ASSY GMD 10-1000

MATERIAL

FINISH

B SIZE

53065-T

SCALE 2/1

SH 1 OF 4

DRAWN 7-30-76
CHK 7-31-76
ENGR
APPD
APPD

ABBREVIATIONS PER MIL-STD-12

TITLE: P.C. ASSY GMD 10-1000
DWG NO. 53065-00 REV ..A...
SHEET. 3. OF. 4.

PRESTON SCIENTIFIC INC.
PRINTED 09/29/76

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
10	1	53068-00	D&R ASSY GMD 10-1000	C
15	1	56409-00	TEMPERATURE INSULATOR	A
20	2	520-00	RESISTOR 1/4W 10% 10	
25	2	521-00	RESISTOR 1/4W 10% 22	
30	3	525-00	RESISTOR 1/4W 10% 100	
32	2	527-00	RESISTOR 1/4W 10% 220	
33	1	531-00	RESISTOR 1/4W 10% 1K	
35	1	533-00	RESISTOR 1/4W 10% 2200	
35	1	533-00	RESISTOR 1/4W 10% 2200	
60	2	538-00	RESISTOR 1/4W 10% 10K	
70	3	540-00	RESISTOR 1/4W 10% 15K	
75	1	546-00	RESISTOR 1/4W 10% 68K	
80	1	547-00	RESISTOR 1/4W 10% 100K	
85	2	555-01	RESISTOR 1/4W 10% 10M	
90	1	440-00	RESISTOR 1/4W 1% 4020	
100	1	445-02	RESISTOR 1/4W 1% 5360	
110	1	446-10	RESISTOR 1/4W 1% 5620	
125	1	476-00	RESISTOR 1/4W 1% 82.5K	
130	4	478-00	RESISTOR 1/4W 1% 100K	
135	1	479-02	RESISTOR 1/4W 1% 249K	
141	1	481-02	RESISTOR 1/4W 1% 332K	
143	1	483-00	RESISTOR 1/4W 1% 392K	
145	1	483-03	RESISTOR 1/4W 1% 402K	
150	3	484-00	RESISTOR 1/4W 1% 499K	
155	1	488-16	RESISTOR 1/4W 1% 1M	
160	1	488-02	RESISTOR 1/4W 1% 2.49M	
170	1	602-09	RESISTOR3.75W 1% 560	
190	2	50040-25	RESISTOR .03% 1113.6	
200	1	50060-00	RESISTOR .03% 10K	A
205	1	50060-02	RESISTOR .03% 10.02K	A
210	1	340-07	POTENTIOMETER 20	
220	2	359-03	POTENTIOMETER 10K	
230	1	361-81	POTENTIOMETER 25K	
250	2	373-04	POTENTIOMETER 100K	
260	1	47-01	CAPACITOR 1PF	
270	1	47-02	CAPACITOR 2PF	
272	1	48-00	CAPACITOR 3PF	
274	1	50-01	CAPACITOR 5PF	
276	1	52-00	CAPACITOR 5% 10PF	
280	2	55-01	CAPACITOR 5% 22PF	
290	2	61-01	CAPACITOR 10% 100PF	
300	1	76-02	CAPACITOR 20% 1000PF	
305	2	76-00	CAPACITOR 5% 1000PF	
307	1	93-01	CAPACITOR 10% .01UF	
310	4	116-00	CAPACITOR 2UF 50V	
320	6	131-00	CAPACITOR 20% 2.2UF 20V	
325	1	144-00	CAPACITOR 20% 22UF 15V	
330	1	232-03	DIODE ZENER 1N5227B	
335	3	248-06	DIODE ZENER 1N5231B	
337	1	248-10	DIODE ZENER 1N5240B	

TITLE: P.C. ASSY GMD 10-1000
DWG NO. 53065-00 REV ..A...
SHEET. 4. OF. 4.

PRESTON SCIENTIFIC INC.
PRINTED 09/29/76

PARTS LIST

ITEM	QTY	PART NO	DESCRIPTION	
340	4	239-00	DIODE 1N4148	
345	1	839-00	TRANSISTOR 2N2916	
350	2	846-00	TRANSISTOR 2N3904	
360	4	846-01	TRANSISTOR 2N3906	
365	1	845-08	TRANSISTOR DN1011	
370	1	847-01	TRANSISTOR SELECTED 9934	
380	1	9951-00	TRANSISTOR SELECT	A
385	1	848-23	INTEGRATED CIRCUIT MC3026P	
390	1	849-50	INTEGRATED CIRCUIT 79M15UC	
400	1	849-45	INTEGRATED CIRCUIT 78M15UC	
410	3	849-49	INTEGRATED CIRCUIT LF355H	
430	2	665-00	SCREW PHMS 4-40 X 5/16	
440	2	855-00	WASHER FLAT #4 SM	
450	2	874-00	WASHER LOCK #4	
460	A/R	989-00	WIRE 22 AWG	
465	1	721-03	SOCKET 8 PIN	

TITLE: P.C. ASSY GMD 10-1000
DWG NO. 53065-01 REV ..A...
SHEET. 3. OF. 4.

PRESTON SCIENTIFIC INC.
PRINTED 09/29/76

PARTS LIST

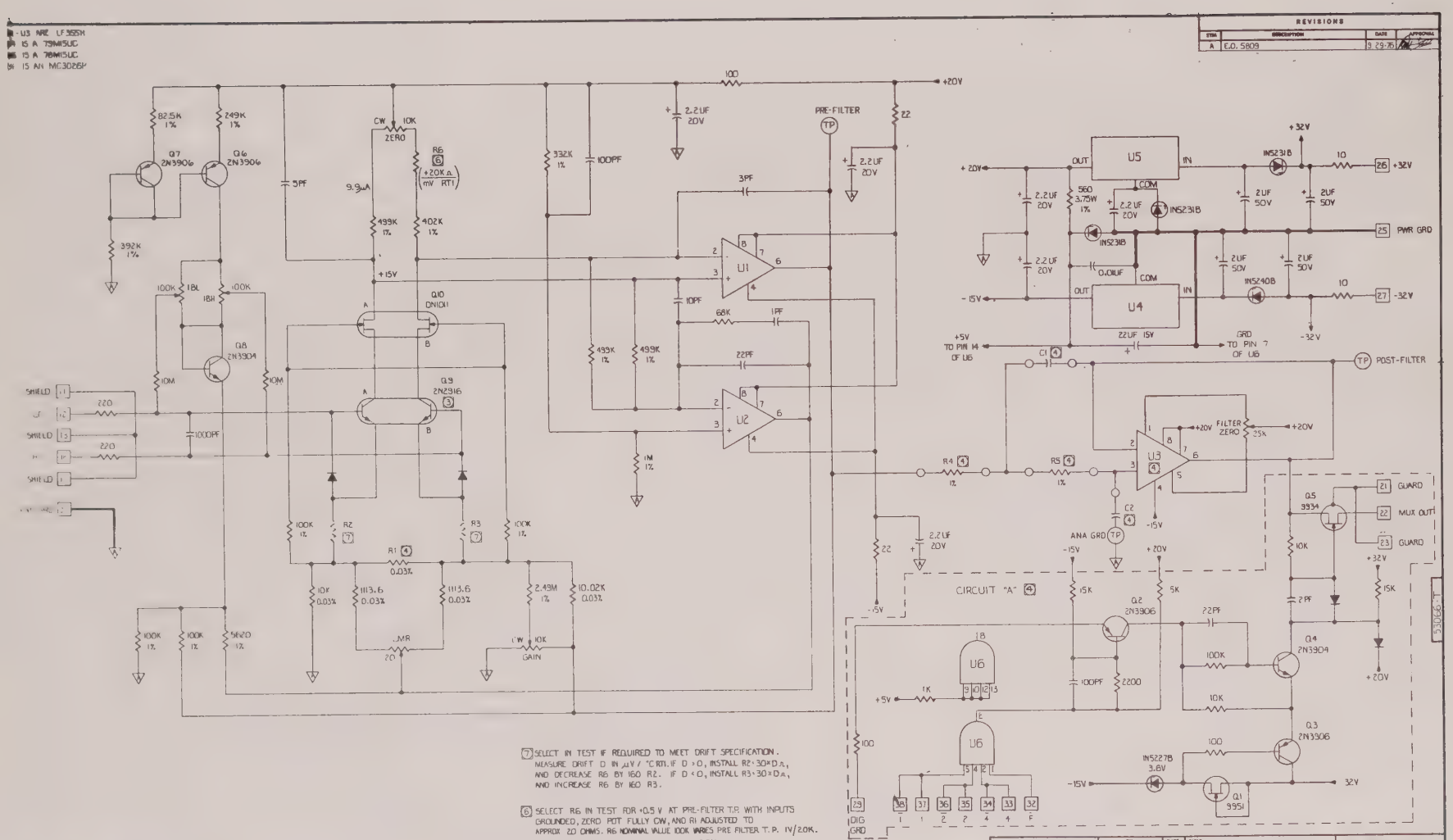
ITEM	QTY	PART NO.	DESCRIPTION	
10	1	53068-00	D&R ASSY GMD 10-1000	C
15	1	56409-00	TEMPERATURE INSULATOR	A
20	2	520-00	RESISTOR 1/4W 10% 10	
25	2	521-00	RESISTOR 1/4W 10% 22	
30	3	525-00	RESISTOR 1/4W 10% 100	
32	2	527-00	RESISTOR 1/4W 10% 220	
33	1	531-00	RESISTOR 1/4W 10% 1K	
35	1	533-00	RESISTOR 1/4W 10% 2200	
60	2	538-00	RESISTOR 1/4W 10% 10K	
70	3	540-00	RESISTOR 1/4W 10% 15K	
75	1	546-00	RESISTOR 1/4W 10% 68K	
80	1	547-00	RESISTOR 1/4W 10% 100K	
85	2	555-01	RESISTOR 1/4W 10% 10M	
90	1	440-00	RESISTOR 1/4W 1% 4020	
100	1	445-02	RESISTOR 1/4W 1% 5360	
110	1	446-10	RESISTOR 1/4W 1% 5620	
125	1	476-00	RESISTOR 1/4W 1% 82.5K	
130	4	478-00	RESISTOR 1/4W 1% 100K	
135	1	479-02	RESISTOR 1/4W 1% 249K	
141	1	481-02	RESISTOR 1/4W 1% 332K	
143	1	483-00	RESISTOR 1/4W 1% 392K	
145	1	483-03	RESISTOR 1/4W 1% 402K	
150	3	484-00	RESISTOR 1/4W 1% 499K	
155	1	488-16	RESISTOR 1/4W 1% 1M	
160	1	488-02	RESISTOR 1/4W 1% 2.49M	
170	1	602-09	RESISTOR3.75W 1% 560	
180	1	50020-90	RESISTOR .03% 222.22	A
190	2	50040-25	RESISTOR .03% 1113.6	
200	1	50060-00	RESISTOR .03% 10K	A
205	1	50060-02	RESISTOR .03% 10.02K	A
210	1	340-07	POTENTIOMETER 20	
220	2	359-03	POTENTIOMETER 10K	
230	1	361-81	POTENTIOMETER 25K	
250	2	373-04	POTENTIOMETER 100K	
260	1	47-01	CAPACITOR 1PF	
270	1	47-02	CAPACITOR 2PF	
272	1	48-00	CAPACITOR 3PF	
274	1	50-01	CAPACITOR 5PF	
276	1	52-00	CAPACITOR 5% 10PF	
280	2	55-01	CAPACITOR 5% 22PF	
290	2	61-01	CAPACITOR 10% 100PF	
300	1	76-02	CAPACITOR 20% 1000PF	
305	2	76-00	CAPACITOR 5% 1000PF	
307	1	93-01	CAPACITOR 10% .01UF	
310	4	116-00	CAPACITOR 2UF 50V	
320	6	131-00	CAPACITOR 20% 2.2UF 20V	
325	1	144-00	CAPACITOR 20% 22UF 15V	
330	1	232-03	DIODE ZENER 1N5227B	
335	3	248-06	DIODE ZENER 1N5231B	
337	1	248-10	DIODE ZENER 1N5240B	

TITLE: P.C. ASSY GMD 10-1000
DWG NO. 53065-01 REV ..A...
SHEET. 4. OF. 4.

PRESTON SCIENTIFIC INC.
PRINTED 09/29/76

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
340	4	239-00	DIODE 1N4148	
345	1	839-00	TRANSISTOR 2N2916	
350	2	846-00	TRANSISTOR 2N3904	
360	4	846-01	TRANSISTOR 2N3906	
365	1	845-08	TRANSISTOR DN1011	
370	1	847-01	TRANSISTOR SELECTED 9934	
380	1	9951-00	TRANSISTOR SELECT	A
385	1	848-23	INTEGRATED CIRCUIT MC3026P	
390	1	849-50	INTEGRATED CIRCUIT 79M15UC	
400	1	849-45	INTEGRATED CIRCUIT 78M15UC	
410	3	849-49	INTEGRATED CIRCUIT LF355H	
430	2	665-00	SCREW PHMS 4-40 X 5/16	
440	2	855-00	WASHER FLAT #4 SM	
450	2	874-00	WASHER LOCK #4	
460	A/R	989-00	WIRE 22 AWG	
465	1	721-03	SOCKET 8 PIN	



7 SELECT IN TEST IF REQUIRED TO MEET DRIFT SPECIFICATION. MEASURE DRIFT D IN µV / °C RTI. IF D > 0, INSTALL R2 = 30×DΩ, AND DECREASE R6 BY 160 R2. IF D < 0, INSTALL R3 = 30×DΩ, AND INCREASE R6 BY 160 R3.

6 SELECT R6 IN TEST FOR +0.5 V AT PRE-FILTER T.P. WITH INPUTS GROUNDED, ZERO POT FULLY CW, AND R1 ADJUSTED TO APPROX 20 OHMS. R6 NOMINAL VALUE 100K VARIES PRE FILTER T.P. 1V/20K.

5. GAIN RESISTOR CALCULATION: $R_1 = \frac{20K}{GAIN-10}$

DASH NO	GAIN	FILTER						
			BE	INSTALL	5360	4020	1000P	INSTALL
			BE	INS AL.	5360	4020	100 F	INSTALL
	GAIN	(Ω) R1	(Hz) BW	TYPE	U3	(Ω) R4	(Ω) R5	(F) C1 & C2	CIRCUIT "A"

TABULATION

BE: BESSEL. MAINTAINS PULSE SHAPE.
BU: BUTTERWORTH.
CH: CHEBYSHEV. SHARP CUTOFF.
NA: NOT APPLICABLE
FILTER TYPE

4 SEE TABULATION.
3 INSTALLED IN SOCKET.
2. ALL DIODES ARE IN4148.
1. ALL RESISTORS ARE 1/4 W, 10%.
NOTE: UNLESS OTHERWISE SPECIFIED.

UNLESS OTHERWISE SPECIFIED
MECHANICAL DWG TOLERANCES
.X ± .030 ANGULAR ± 0° 30'
.XX ± .010 MACH. SURF. 1/2
.XXX ± .005
CLASS 1A OR 2B
REMOVE BURRS & SHARP EDGES .005 MAX.
MACH. FILLET RADIUS .005 X MAX.
MACH. SURF. FLAT WITHIN .005 IN/IN
OTHER SURF. FLAT WITHIN .005 IN/IN
ELECTRICAL DWG DESIGNATIONS
REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.

DWN 2-29-76
CHK 2-5-76
ENG 8-2-76
APP

53065-T
NEXT ASSY

TITLE SCHEMATIC DIAGRAM GMD 10-1000

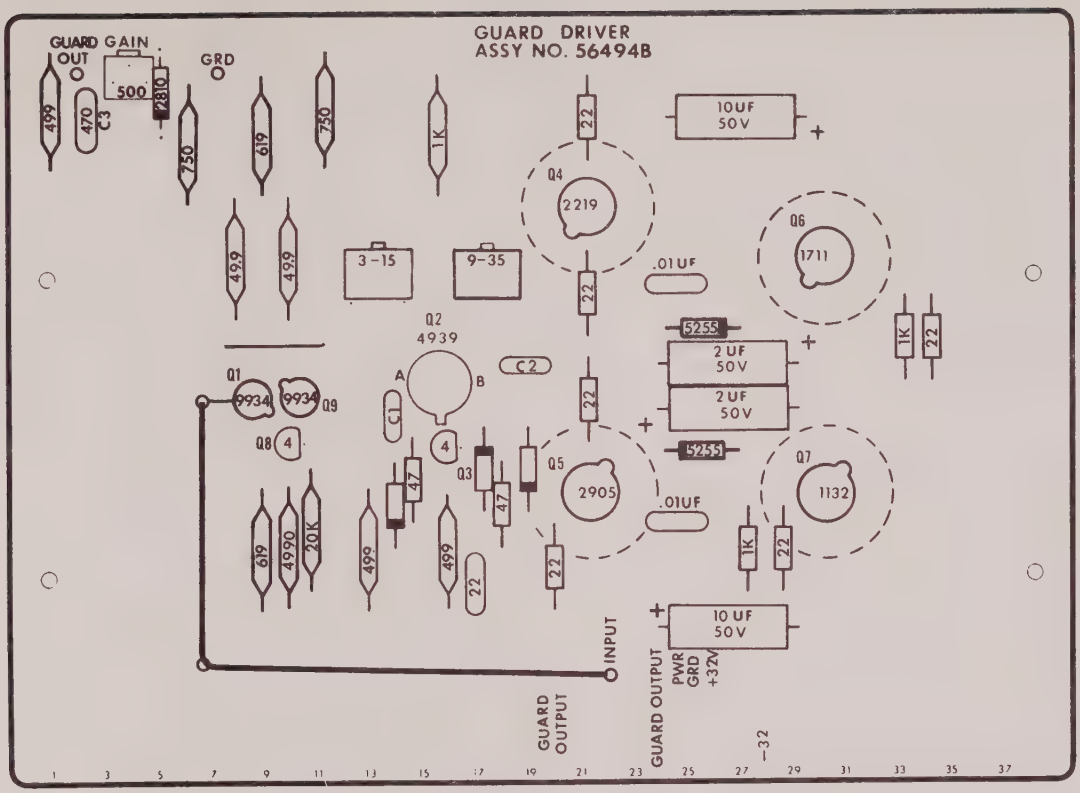
MAT'L

FINISH

D
SIZE

PRESTON
SCIENTIFIC INCORPORATED
801 East Camino Ave., Anaheim, CA 92805
Tel. (714) 774-6400

53066-T
SCALE
SH 1 OF 1



PRESTON SCIENTIFIC INCORPORATED
Anaheim Calif

TITLE PRINTED CIRCUIT ASSY GUARD DRIVER

MATERIAL

FINISH

SCALE 2/1

SIZE

CODE

56494

SH 1 OF 3

BY	DATE
DRAWN M. J. STEM	10-12-72
CHK	10-13-72
ENGR	10-14-72
APPD	
APPD	

ABBREVIATIONS PER MIL-STD-12

56494

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

8. C3 NOMINAL VALUE SHOWN CORRECT VALUE SELECTED IN TEST.
7. C1 & C2 TO BE SELECTED IN TEST.
6. FOR L/M SEE SHEET 3 OF 3.
5. TIE GATE LEAD OF Q9 TO BIFURCATED TERMINAL.
4. INSTALL HEAT SINK (ITEM 290) ON TRANSISTORS Q4, Q5, Q6 & Q7 USING SILICONE GREASE (ITEM 280)
3. FOR SCHEMATIC DIAGRAM SEE DWG 56495.
2. ALL DIODES ARE IN4148.
1. ALL CAPACITORS ARE IN PF.

NOTES UNLESS OTHERWISE SPECIFIED

BY	DATE
DRAWN M. J. STEM	10-12-72
CHK	10-13-72
ENGR	10-14-72
APPD	
APPD	

TITLE PRINTED CIRCUIT ASSY GUARD DRIVER

PRESTON SCIENTIFIC INCORPORATED

MATERIAL

FINISH

SCALE

SIZE A

CODE 56494

SH 2 OF 3

59175

NEXT ASSY

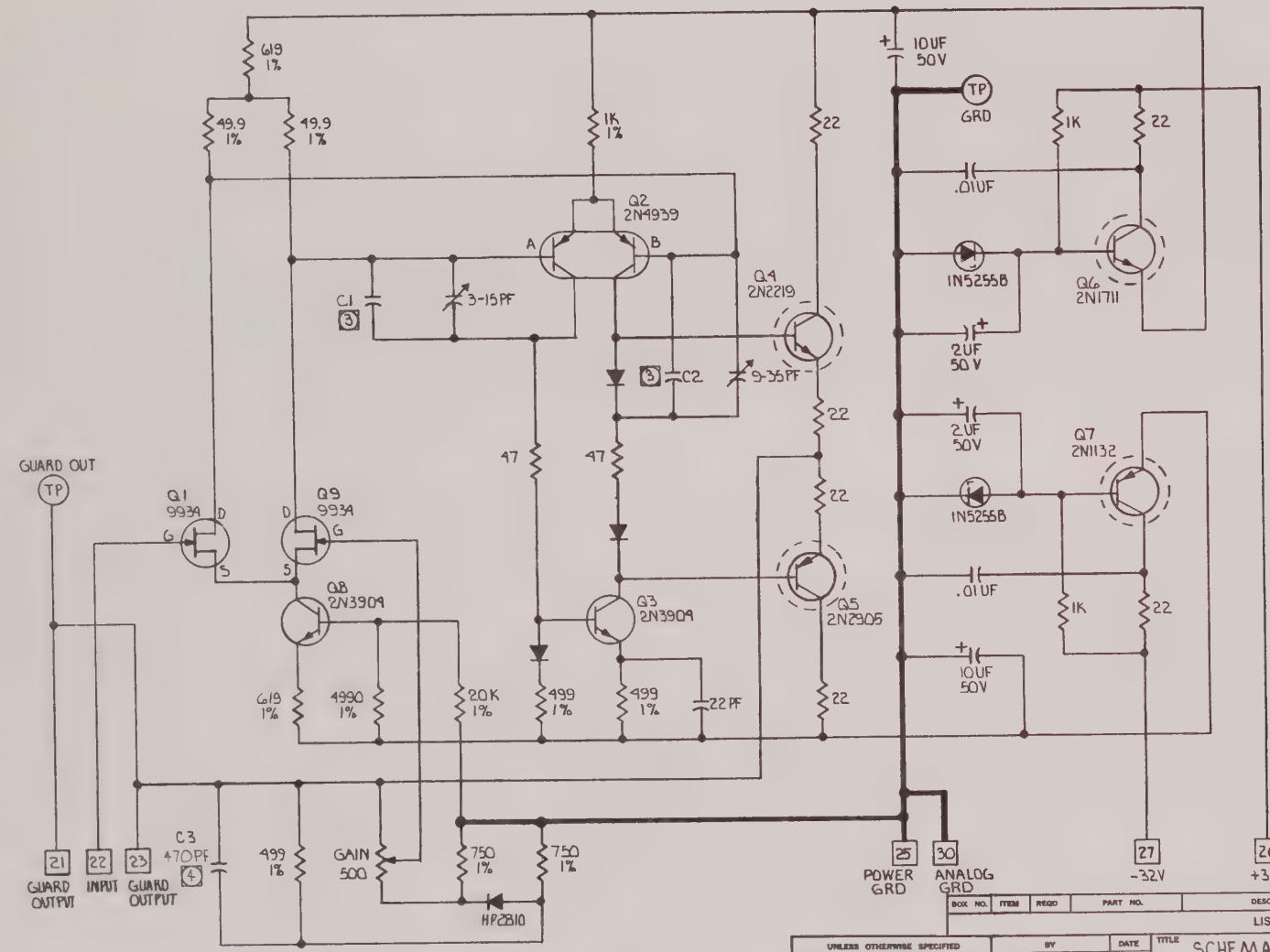
TITLE: P.C. ASSY GUARD DRIVER
DWG NO. 56494-00 REV -------
SHEET 3 OF 3

PRESTON SCIENTIFIC INC.
PRINTED 10/13/72

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	56497-00	DRILL & RIVET ASSY	
040	6	521-00	RESISTOR 1/4W 10%	22
050	2	523-00	RESISTOR 1/4W 10%	47
060	2	531-00	RESISTOR 1/4W 10%	1K
080	2	394-12	RESISTOR 1/4W 1%	49.9
090	3	402-02	RESISTOR 1/4W 1%	499
095	2	405-01	RESISTOR 1/4W 1%	619
100	2	407-00	RESISTOR 1/4W 1%	750
110	1	409-00	RESISTOR 1/4W 1%	1K
115	1	445-00	RESISTOR 1/4W 1%	4990
120	1	465-02	RESISTOR 1/4W 1%	20K
125	1	344-80	POTENTIOMETER	500
140	1	55-01	CAPACITOR	22PF
145	1	78-01	CAPACITOR	3-15PF
150	1	77-01	CAPACITOR	9-35PF
155	1	72-01	CAPACITOR	470PF
160	2	93-01	CAPACITOR	.01UF
170	2	116-00	CAPACITOR	2UF 50V
180	2	142-01	CAPACITOR	10UF 50V
185	1	248-22	DIODE	HP2810
190	3	239-00	DIODE	1N4148
200	2	247-20	DIODE	1N5255B
210	1	828-00	TRANSISTOR	2N1711
220	1	824-00	TRANSISTOR	2N1132
230	1	830-01	TRANSISTOR	2N2219
240	1	838-02	TRANSISTOR	2N2905
250	2	846-00	TRANSISTOR	2N3904
260	1	846-08	TRANSISTOR	2N4939
270	2	847-01	TRANSISTOR SELECT	9934
280	A/R	904-00	SILICONE GREASE	
290	4	284-01	HEATSINK	

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	E.O. 4495	10-24-72	
B	E.O. 5394	10-3-74	



(4) C3 NOMINAL VALUE SHOWN, CORRECT VALUE SELECTED IN TEST.

(3) C1 & C2 TO BE SELECTED IN TEST.

2. ALL DIODES ARE IN4148.

1. ALL RESISTORS ARE 1/4W, 10%.

NOTES: UNLESS OTHERWISE SPECIFIED

56494
NEXT ASSY

LIST OF MATERIALS

BOX NO.	ITEM	REQD	PART NO.	DESCRIPTION	VALUE	REFERENCE DESIGNATION

UNLESS OTHERWISE SPECIFIED

MECHANICAL DWG TOLERANCES

X ± .030 ANGULAR ± 0° 30'
XX ± .010
XXX ± .005 MACH. SURF.
THREADS: CLASS 3A OR 2B
REMOVE BURRS & SHARP EDGES .030 MAX.
MACH. FILLET RADIUS .020 R MAX.
MACH. SURF. FLAT WITHIN .001 IN/IN
OTHER SURF. FLAT WITHIN .005 IN/IN

ELECTRICAL DWG DESIGNATIONS

REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.

	BY	DATE
DRAWN	M. J. STEM	10-13-72
CHK		10-13-72
ENGR		10-18-72
APPD		
APPD		

ABBREVIATIONS PER MIL-STD-12

TITLE: SCHEMATIC DIAGRAM GUARD DRIVER

PRESTON SCIENTIFIC INCORPORATED Anaheim, Calif.

MATERIAL

FINISH

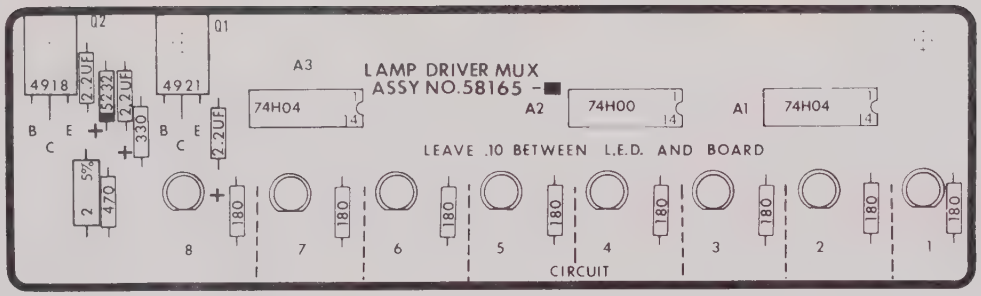
SIZE: C

56495

CODE

SCALE

SH | OF |



5 FOR TABULATION SEE SH 2 OF 3
4 ALL LED. DIODES ARE 135-3510.
3. ALL RESISTORS ARE 1/4W 10%.
2. FOR P/L SEE SH 3 OF 3.
1. FOR SCHEMATIC SEE DWG 58166-T.
NOTE: UNLESS OTHERWISE SPECIFIED

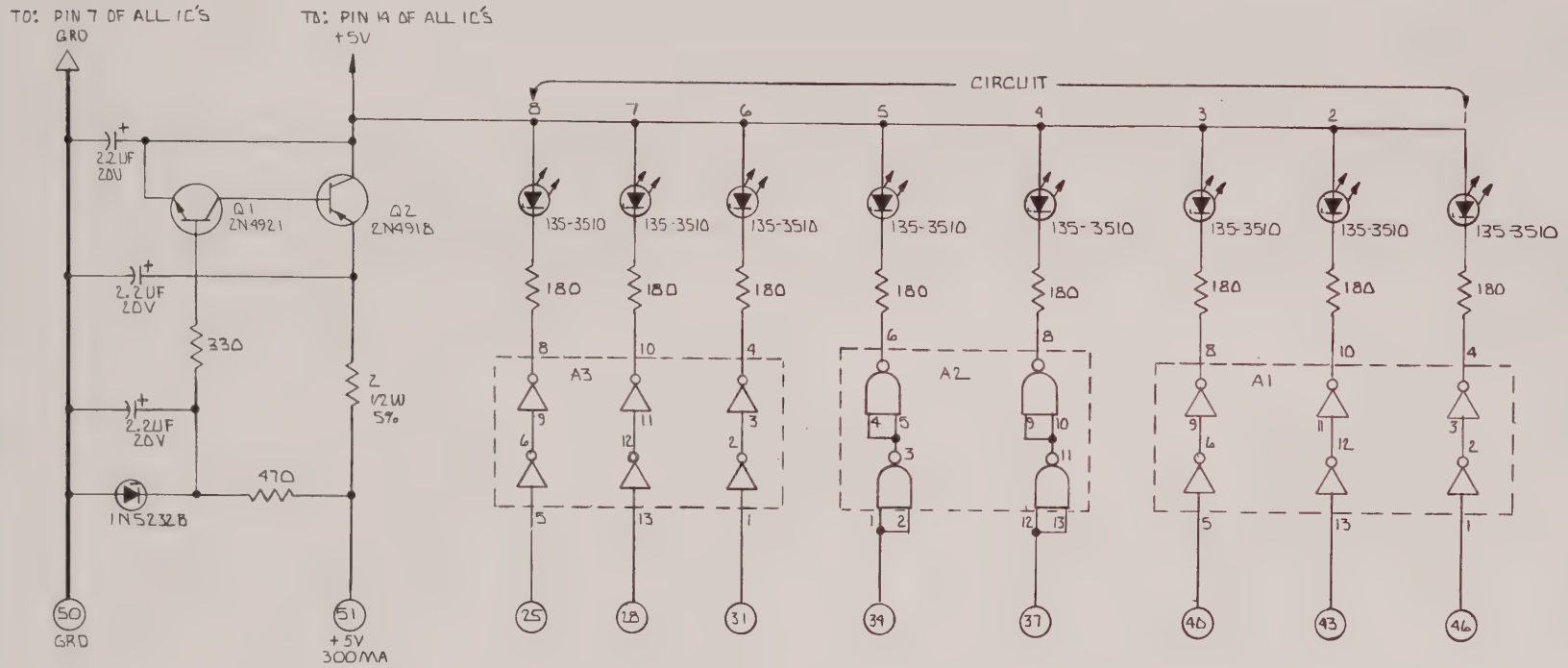
DRAWN	M.J. Stem	DATE	11-27-73	TITLE PRINTED CIRCUIT ASSY LAMP DRIVER MUX
CHK				
ENGR				
APPD				
APPD				
MATERIAL				PRESTON
FINISH				B 58165-T
NEXT ASSY		SCALE		SIZE CODE SH 1 OF 3

DASH NO.	OMIT CIRCUIT	OMIT I.C.
58165-00	AS SHOWN	
58165-01	8	
58165-02	8 & 7	
58165-03	8-6	A3
58165-04	8-5	A3
58165-05	8-4	A3 & A2
58165-06	8, 7, 1 & 2	
58165-07	1-7	A1 & A2

TABULATION

A1 & A3 A[illegible] 74[illegible]

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL



58166-7	1-7	A1 & A2
58166-6	8-7-2 & 1	
58166-5	8-4	A3 & A2
58166-4	8-5	A3
58166-3	8-6	A3
58166-2	8-7	
58166-1	8	
58166-0	AS SHOWN	
DASH NO.	OMIT CIRCUIT	OMIT I.C
TABULATION		

NOTES: 1. ALL RESISTORS ARE 1/4W, 10%. UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED
MECHANICAL DWG TOLERANCES
.X ± .030 ANGULAR ± 0° 30'
.XX ± .020 63
.XXX ± .005 MACH. SURF.
THREADS: CLASS 2A OR 2B
REMOVE BURRS & SHARP EDGES .020 MAX.
MACH. FILLET RADIUS .020 R MAX.
MACH. SURF. FLAT WITHIN .001 IN/IN
OTHER SURF. FLAT WITHIN .005 IN/IN
ELECTRICAL DWG DESIGNATIONS
REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.

	BY	DATE
DWN	P. J. BROWN	11-9-73
CHK	M. J. STEM	11-12-73
ENG		
APP	[illegible]	11-12-73

58165-T
NEXT ASSY

TITLE SCHEMATIC DIAGRAM LAMP DRIVER MUX

MAT'L

FINISH

C SIZE

PRESTON
SCIENTIFIC INCORPORATED
805 East Carrier Ave., Anaheim, Calif. 92805
Tel. (714) 776-6400

58166-T

SCALE SH 1 OF 1

58166-T

REV	E.O. NO.	DATE	APPR.
A	5374	9-5-74	[illegible]
B	5467	3-21-75	[illegible]
C	5558	9-4-75	[illegible]

5. ALL L.E.D.'S ARE 135-3510
4. FOR TABULATION SEE SH. 2 OF 3.
3. ALL RESISTORS ARE 1/4W, 10%.
2. FOR PARTS LIST SEE SH. 3 OF 3.
1. FOR SCHEMATIC SEE 59891.

NOTES UNLESS OTHERWISE SPECIFIED

BY	DATE
DRAWN [illegible]	11-6-73
CHK [illegible]	11-8-[illegible]
ENGR	
APPD	
APPD	

58685

NEXT ASSY

TITLE PRINTED CIRCUIT ASSY LAMP DRIVER ADC

MATERIAL

FINISH

SCALE

SIZ:

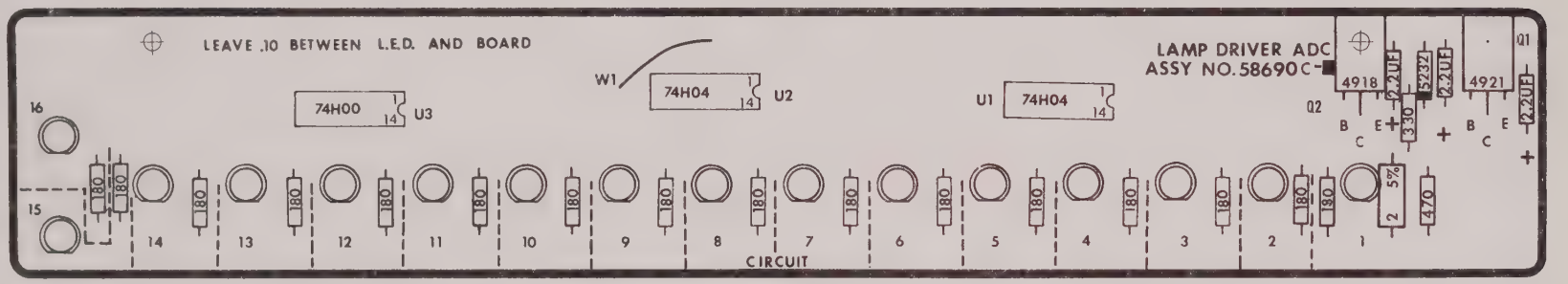
PRESTON

SCIENTIFIC INCORPORATED
805 East Cerritos Ave., Anaheim, Calif. 92805
Tel (714) 776-6400

58690-T

CODE

SH 1 OF 4



58690-29	13-14-15	———	INSTALL
58690-28	1-6 & 15	U1	INSTALL
58690-27	15-13		OMIT
-26	1-5, 13 & 14		
-25	1-6	U1	
-24	1-6 & 14	U1	
-23	1-6 & 15	U1	
-22	14-6	U3	
-21	14-7	U3	
-20	14-8	U3	
-19	14-9	U3	
-18	14-10	U3	
-17	14-11	U3	
-16	14-12		
-15	14 & 13		
-14	14		
-13	16-4	U2 & U3	
-12	16-5	U2 & U3	
-11	16-6	U2 & U3	
-10	16-7	U2 & U3	
-09	16-8	U3	
-08	16-9	U3	
-07	16-10	U3	
-06	16-11	U3	
-05	16-12		
-04	16-13		
-03	16-14		
-02	16 & 15		
-01	16		
58690-00	AS SHOWN		OMIT
DASH NO.	OMIT CIRCUIT	OMIT I.C.	W1

TITLE: P.C. ASSY LAMP DRIVER ADC
DWG NO. 58690-00 REV D
SHEET 1 OF 1

PRESTON SCIENTIFIC INC.
PRINTED 11/02/73

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	58693-00	D&R ASSY LAMP DRIVER ADC	C
020	16	526-00	RESISTOR 1/4W 10% 180	
022	1	528-00	RESISTOR 1/4W 10% 330	
024	1	529-00	RESISTOR 1/4W 10% 470	
026	1	558-06	RESISTOR 1/2W 5% 2	
028	3	131-00	CAPACITOR 20% 2.2UF 20V	
030	16	248-26	DIODE L.E.D. 135-3510	
032	1	244-08	DIODE ZENER 1N5232B	
036	1	846-10	TRANSISTOR 2N4918	
038	1	846-03	TRANSISTOR 2N4921	
040	1	848-14	INTEGRATED CIRCUIT 74H00	
050	2	848-40	INTEGRATED CIRCUIT 74H04	

TITLE: P.C. ASSY LAMP DRIVER ADC
DWG NO. 58690-16 REV D
SHEET 1 OF 1

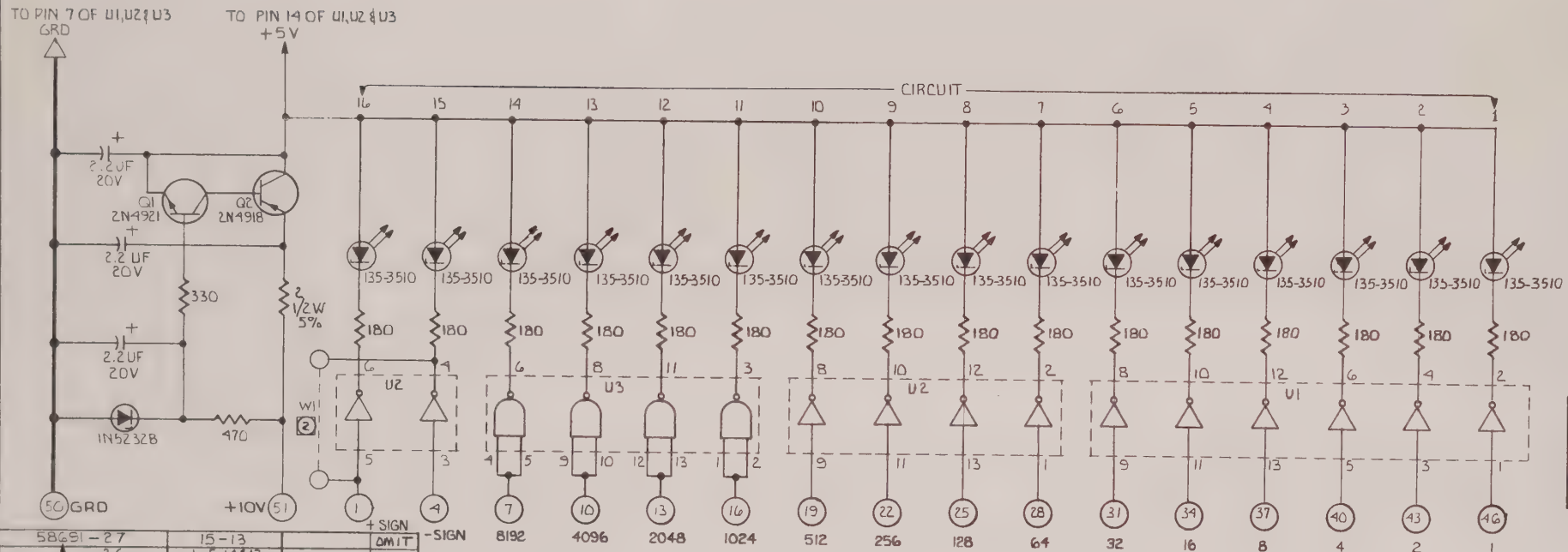
PRESTON SCIENTIFIC INC.
PRINTED 1/16/74

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	58693-00	D&R ASSY LAMP DRIVER ADC	C
020	13	526-00	RESISTOR 1/4W 10% 180	
022	1	528-00	RESISTOR 1/4W 10% 330	
024	1	529-00	RESISTOR 1/4W 10% 470	
026	1	558-06	RESISTOR 1/2W 5% 2	
028	3	131-00	CAPACITOR 20% 2.2UF 20V	
030	13	248-26	DIODE L.E.D. 135-3510	
032	1	244-08	DIODE ZENER 1N5232B	
036	1	846-10	TRANSISTOR 2N4918	
038	1	846-03	TRANSISTOR 2N4921	
040	1	848-14	INTEGRATED CIRCUIT 74H00	
050	2	848-40	INTEGRATED CIRCUIT 74H04	

U1 & U2 ARE 74H04
U3 IS 74H00

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	E.O. 5374	9-5-74	[illegible]
B	E.O. 5467	3-21-75	[illegible]
C	E.O. 5558	9-4-75	PHP/[illegible]



58691-27	15-13		OMIT
-26	1-5, 14 & 13		
-25	1-6	U1	
-24	1-6 & 14	U1	
-23	1-6 & 15	U1	
-22	14-6	U3	
-21	14-7	U3	
-20	14-8	U3	
-19	14-9	U3	
-18	14-10	U3	
-17	14-11	U3	
-16	14-12		
-15	14 & 13		
-14	14		
-13	16-4	U2 & U3	
-12	16-5	U2 & U3	
-11	16-6	U2 & U3	
-10	16-7	U2 & U3	
-09	16-8	U3	
-08	16-9	U3	
-07	16-10	U3	
-06	16-11	U3	
-05	16-12		
-04	16-13		
-03	16-14		
-02	16 & 15		
-01	16		
58691-00	AS SHOWN		OMIT
DASH NO.	OMIT CIRCUIT	OMIT I.C.	W1

TABULATION

58690-29	15-13	———	INSTALL
58690-28	1-6 & 15	U1	INSTALL
DASH NO.	OMIT CIRCUIT	OMIT I.C.	W1

2 SEE TABULATION.
1. ALL RESISTORS ARE 1/4W, 10%.
NOTES: UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED
MECHANICAL DWG TOLERANCES
.X ± .050 ANGULAR ± 0° 30'
.XX ± .020 63
.XXX ± .005 MACH. SURF.
THREADS: CLASS 2A OR 2B
REMOVE BURRS & SHARP EDGES .020 MAX.
MACH. FILLET RADIUS .020 R MAX.
MACH. SURF. FLAT WITHIN .001 IN/IN
OTHER SURF. FLAT WITHIN .005 IN/IN
ELECTRICAL DWG DESIGNATIONS
REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.

	BY	DATE
DWN	[illegible]	11-6-73
CHK	[illegible]	11-8-73
ENG	[illegible]	11-8-73
APP		

58690
NEXT ASSY

TITLE SCHEMATIC DIAGRAM
LAMP DRIVER ADC

MAT'L

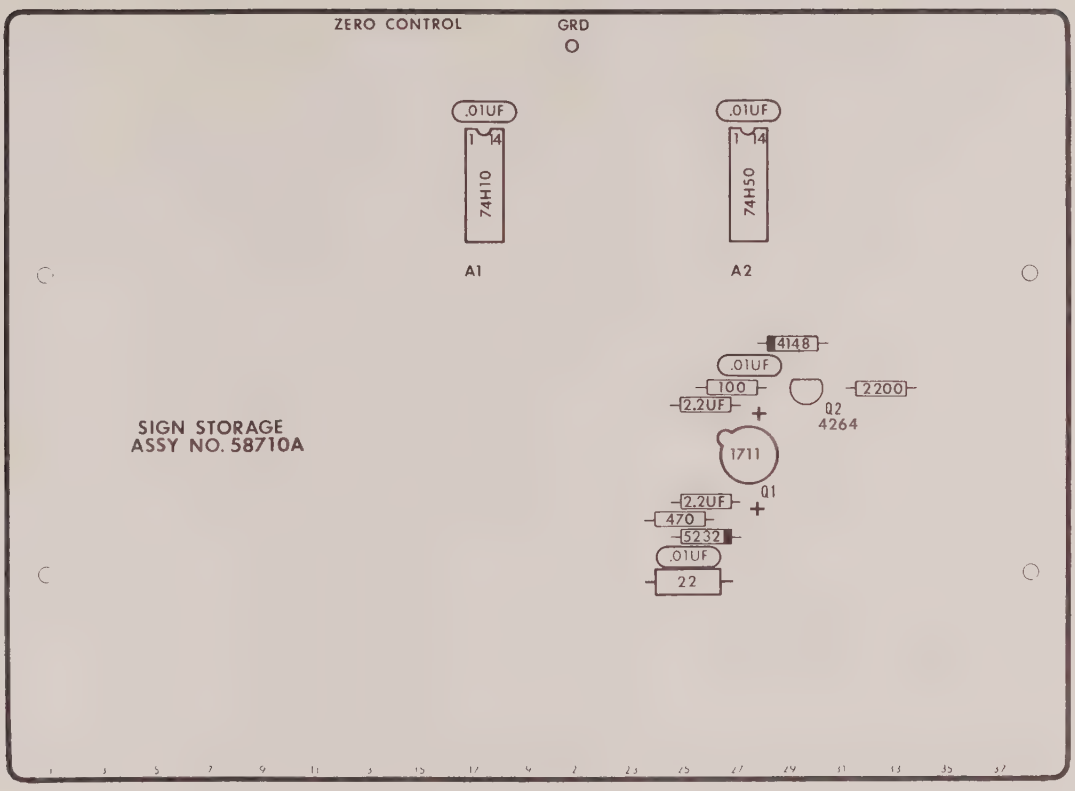
FINISH

C
SIZE

PRESTON
SCIENTIFIC INCORPORATED
805 East Cerritos Ave., Anaheim, Calif. 92805
Tel. (714) 776-6400

58691-T
SCALE
SH 1 OF 1

58691-T



58700
NEXT ASSY

PRESTON SCIENTIFIC INCORPORATED Anaheim Calif

TITLE PRINTED CIRCUIT ASSY SIGN STORAGE

MATERIAL

FINISH

SCALE 2/1

B SIZE

58710 CODE

SH 1 OF 3

DRAWN 1-8-73

CHK

ENGR

APPD

APPD

ABBREVIATIONS PER MIL-STD-12

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

DETAIL "A"

4 INSTALL WIRE (ITEM 160) IN HOLES WITH CIRCUITRY ON COMPONENT SIDE & SOLDER BOTH SIDES. SEE DETAIL "A"

3. ALL RESISTORS ARE 1/4W 10%.
2. FOR PARTS LIST SEE SH 3 OF 3.
1. FOR LOGIC DIAGRAM SEE DWG 58711.

NOTE: UNLESS OTHERWISE SPECIFIED

BY	DATE
DRAWN	1-9-74
CHK	1-10-74
ENGR D C Symons	1-12-74
APPD	
APPD	

TITLE PRINTED CIRCUIT ASSY SIGN STORAGE

MATERIAL

FINISH

SCALE

SIZE A

PRESTON SCIENTIFIC INCORPORATED
805 East Cerritos Ave., Anaheim, Calif 92805
Tel. (714) 776-6400

58700
NEXT ASSY

58710 CODE

SH 2 OF 3

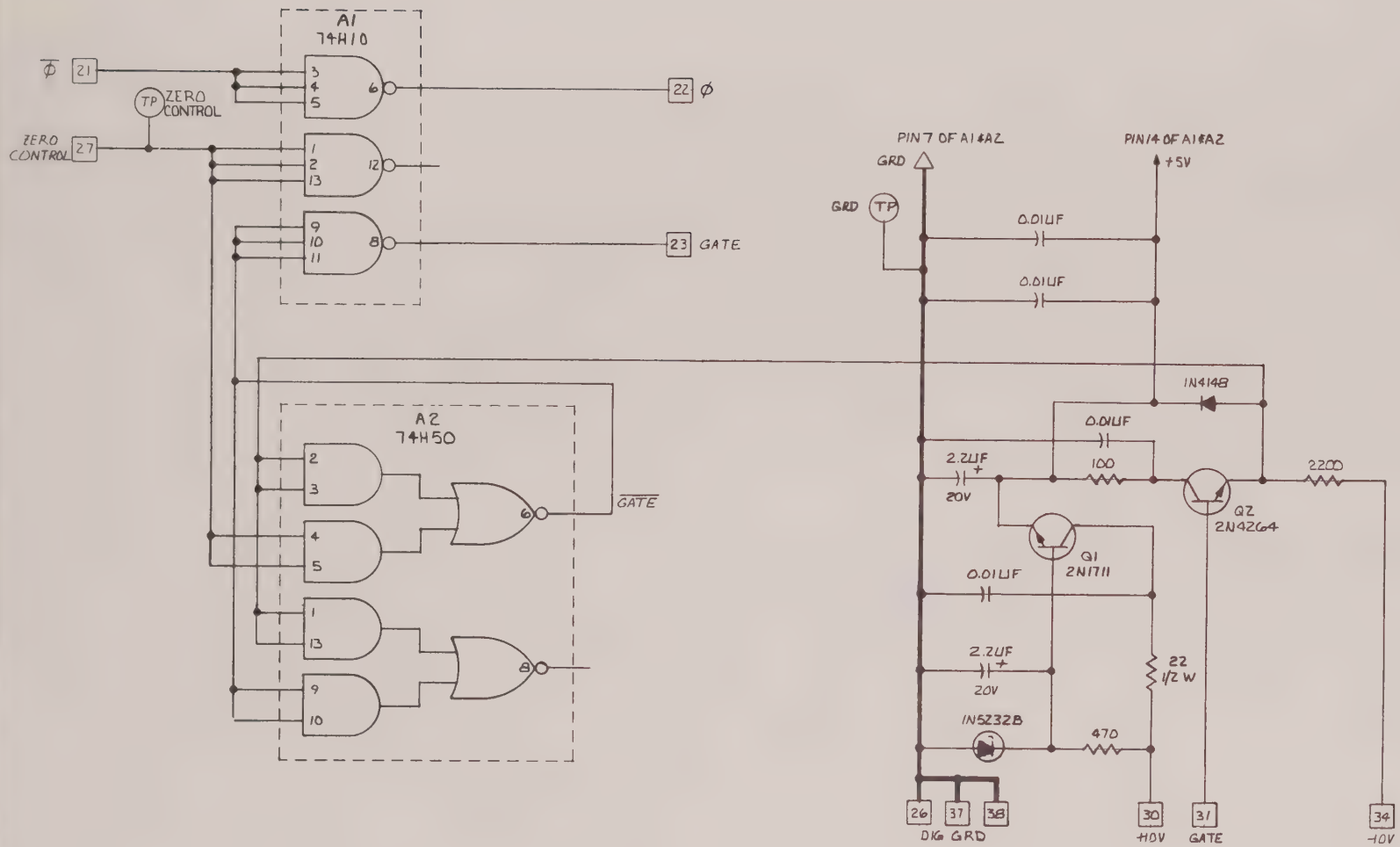
TITLE: P.C. ASSY SIGN STORAGE
DWG NO. 58710-00 REV _____
SHEET 3 OF 3

PRESTON SCIENTIFIC INC
PRINTED 5/03/74

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION		
010	1	58713-00	D&R ASSY SIGN STORAGE		C
030	1	525-00	RESISTOR 1/4W 10%	100	
040	1	529-00	RESISTOR 1/4W 10%	470	
060	1	533-00	RESISTOR 1/4W 10%	2200	
070	1	561-00	RESISTOR 1/2W 10%	22	
080	4	93-01	CAPACITOR 10%	.01UF	
090	2	131-00	CAPACITOR 20%	2.2UF 20V	
100	1	239-00	DIODE	1N4148	
110	1	244-08	DIODE ZENER	1N5232B	
120	1	828-00	TRANSISTOR	2N1711	
130	1	842-01	TRANSISTOR	2N4264	
140	1	848-48	INTEGRATED CIRCUIT	74H10	
150	1	848-24	INTEGRATED CIRCUIT	74H50	
160	A/R	989-00	WIRE 22 AWG		

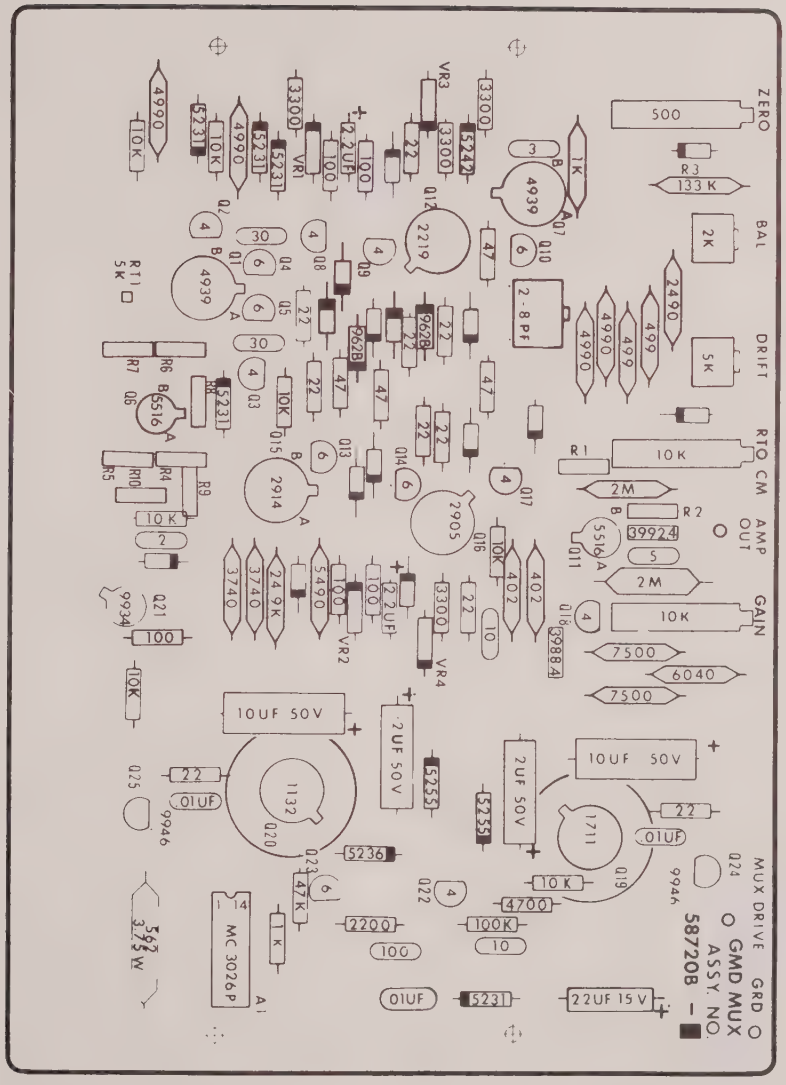
REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	E.O.5304	5-2-79	



58711

1. ALL RESISTORS ARE 1/4W 10%.
NOTE. UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED	BY	DATE	TITLE	
MECHANICAL DWG TOLERANCES	DWN	1-9-79	LOGIC DIAGRAM SIGN STORAGE	PRESTON
X ± .005 ANGULAR ± 0° 30'	CHK	1-10-79		SCIENTIFIC INCORPORATED
XX ± .010	ENG	1-10-79	MAT'L	803 East Cerritos Ave., Anaheim, Calif. 92805
XXX ± .005 MACH. SURF.	APP			Tel. (714) 776-6400
THREADS CLASS 3A OR 3B				
REMOVE BURRS & SHARP EDGES .005 MAX.	58710		FINISH	C 58711
MACH. FILLET RADIUS .030 R MAX.	NEXT ASSY			SIZE SCALE SH 1 OF 1
MACH. SURF. FLAT WITHIN .001 IN/IN				
OTHER SURF. FLAT WITHIN .005 IN/IN				
ELECTRICAL DWG DESIGNATIONS				
REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.				



BY DRAWN B. HEIDEMAN CHD ENGR APPD APPD	DATE 1-1074	TITLE PRINTED CIRCUIT ASSY GMD MUX AMPLIFIER	PRESTON SCIENTIFIC INCORPORATED	
		MATERIAL		
ABBREVIATIONS PER MIL-STD-12		FINISH	58720-T	58700
		SCALE	SIZE CODE	SH 4 OF 4 NEXT ASSY

TABULATION

DASH NO.	FUNCTION	R1, 0.02%	R2, 0.02%	R8, 0.02%	R9, 0.02%	R10, 0.02%
58720-00	5 V.F.S.	1993	1993	OMIT	OMIT	OMIT
58720-01	10 V.F.S.	3988.4	3988.4	OMIT	OMIT	OMIT
58720-02	10.24 V.F.S.	4084	4084	OMIT	OMIT	OMIT
58720-03	8.192 V.F.S.	3267.2	3267.2	OMIT	OMIT	OMIT
58720-04	2 V.F.S.	3988.4	3988.4	OMIT	OMIT	OMIT
58720-05	20 V.F.S.	3988.4	3988.4	50K	OMIT	OMIT
58720-06	100 V.F.S.	3988.4	3988.4	OMIT	10K	10K

TABULATION

	VR1 & VR2	VR3 & VR4	R4	R5	R6	R7
-00	IN5240B	IN5234B	(10)	470	(10)	470
-01	IN5240B	IN5245B	(10)	470	(10)	470
-02	IN5241B	IN5245B	(10)	470	(10)	470
-03	IN5239B	IN5245B	(10)	470	(10)	470
-04	IN5240B	IN5226B	(10)	470	(10)	470
-05	IN5240B	IN5245B	STRAP	50K, 0.02%	STRAP	STRAP
-06	IN5240B	IN5245B	45K, 0.02%	45K, 0.02%	45K, 0.02%	45K, 0.02%

(10) FOR -00 THRU -04 REPLACE R4 & R5 WITH 1 (ONE) 470 OHM, 1/4W, 10% RESISTOR. TYP. FOR R6 & R7.

9. INSTALL WIRE (ITEM 550) IN HOLES WITH CIRCUITRY ON COMPONENT SIDE & SOLDER BOTH SIDES WHERE APPLICABLE.
8. INSTALL HEATSINK (ITEM 530) ON TRANSISTORS Q19 & Q20 USING SILICONE GREASE (ITEM 540).
7. R3 NOMINAL VALUE SHOWN, ACTUAL VALUE SELECT IN TEST.
6. FOR R1, R2, R4-R10 AND VR1-VR4 VALUES SEE TABULATION.
5. ALL CAPACITOR VALUES ARE IN PF.
4. ALL DIODES ARE IN4148.
3. ALL RESISTORS ARE 1/4W, 10%.
2. FOR PARTS LIST SEE SHEET 3 & 4 OF 4.
1. FOR SCHEMATIC DIAGRAM SEE DWG NO. 58721-T.

NOTE: UNLESS OTHERWISE SPECIFIED

PRESTON SCIENTIFIC INCORPORATED Anaheim, Calif.	PRINTED CIRCUIT ASSY GMD MUX AMPLIFIER	58720-T
		CODE ——— SH 2 OF 4

D3

TITLE: P.C. ASSY GMD MUX AMPLIFIER
DWG NO. 58720-00 REV C
SHEET 3 OF 4

PRESTON SCIENTIFIC INC.
PRINTED 5/03/74

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	58723-00	D&R ASSY GMD MUX AMPLIFIER	C
020	10	521-00	RESISTOR 1/4W 10% 22	
030	4	523-00	RESISTOR 1/4W 10% 47	
040	5	525-00	RESISTOR 1/4W 10% 100	
050	2	529-00	RESISTOR 1/4W 10% 470	
060	1	531-00	RESISTOR 1/4W 10% 1K	
065	1	533-00	RESISTOR 1/4W 10% 2200	
070	4	535-00	RESISTOR 1/4W 10% 3300	
075	1	536-00	RESISTOR 1/4W 10% 4700	
080	7	538-00	RESISTOR 1/4W 10% 10K	
095	1	544-00	RESISTOR 1/4W 10% 47K	
098	1	547-00	RESISTOR 1/4W 10% 100K	
100	2	401-04	RESISTOR 1/4W 1% 402	
110	2	402-02	RESISTOR 1/4W 1% 499	
120	1	409-00	RESISTOR 1/4W 1% 1K	
130	1	427-00	RESISTOR 1/4W 1% 2490	
140	2	439-01	RESISTOR 1/4W 1% 3740	
150	4	445-00	RESISTOR 1/4W 1% 4990	
160	1	446-00	RESISTOR 1/4W 1% 5490	
170	1	448-00	RESISTOR 1/4W 1% 6040	
180	2	451-06	RESISTOR 1/4W 1% 7500	
190	1	467-03	RESISTOR 1/4W 1% 24.9K	
200	1	478-16	RESISTOR 1/4W 1% 133K	
220	2	488-11	RESISTOR 1/2W 1% 2M	
228	1	602-09	RESISTOR3.75W 1% 560	
230	2	998-19	RESISTOR .02% 1993	
240	1	998-25	RESISTOR .02% 3988.4	
250	1	998-30	RESISTOR .02% 3992.4	
255	1	374-02	THERMISTOR 5K	
260	1	344-07	POTENTIOMETER 500	
270	1	346-80	POTENTIOMETER 2K	
280	1	351-80	POTENTIOMETER 5K	
290	2	359-03	POTENTIOMETER 10K	
295	1	47-02	CAPACITOR 2PF	
300	1	48-00	CAPACITOR 3PF	
310	1	50-01	CAPACITOR 5PF	
320	2	52-01	CAPACITOR 5% 10PF	
325	2	56-01	CAPACITOR 5% 30PF	
326	2	61-01	CAPACITOR 10% 100PF	
330	1	79-01	CAPACITOR TRIMMER 2-8PF	
340	3	93-01	CAPACITOR 10% .01UF	
350	2	116-00	CAPACITOR 2UF 50V	
360	2	131-00	CAPACITOR 20% 2.2UF 20V	
370	2	142-01	CAPACITOR 10UF 50V	
375	1	144-00	CAPACITOR 20% 22UF 15V	
380	15	239-00	DIODE 1N4148	
385	2	240-80	DIODE ZENER 1N962B	
390	5	248-06	DIODE ZENER 1N5231B	
392	2	248-08	DIODE ZENER 1N5234B	
395	1	248-07	DIODE ZENER 1N5236B	

TITLE: P.C. ASSY GMD MUX AMPLIFIER
DWG NO. 58720-00 REV C
SHEET 4 OF 4

PRESTON SCIENTIFIC INC.
PRINTED 5/03/74

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
400	2	248-10	DIODE ZENER	1N5240B
410	1	237-00	DIODE ZENER	1N5242B
430	2	247-20	DIODE ZENER	1N5255B
440	1	824-00	TRANSISTOR	2N1132
450	1	828-00	TRANSISTOR	2N1711
460	1	830-02	TRANSISTOR	2N2219A
470	1	838-02	TRANSISTOR	2N2905A
480	1	838-04	TRANSISTOR	2N2914
490	7	846-00	TRANSISTOR	2N3904
500	6	846-01	TRANSISTOR	2N3906
510	2	846-08	TRANSISTOR	2N4939
520	2	847-12	TRANSISTOR	2N5516
525	1	847-01	TRANSISTOR SELECTED	9934
528	2	9946-00	TRANSISTOR SELECT	A
530	2	284-01	HEAT SINK	
535	1	848-23	INTEGRATED CIRCUIT	MC3026P
540	A/R	904-00	SILICONE GREASE	
550	A/R	989-00	WIRE 22 AWG	

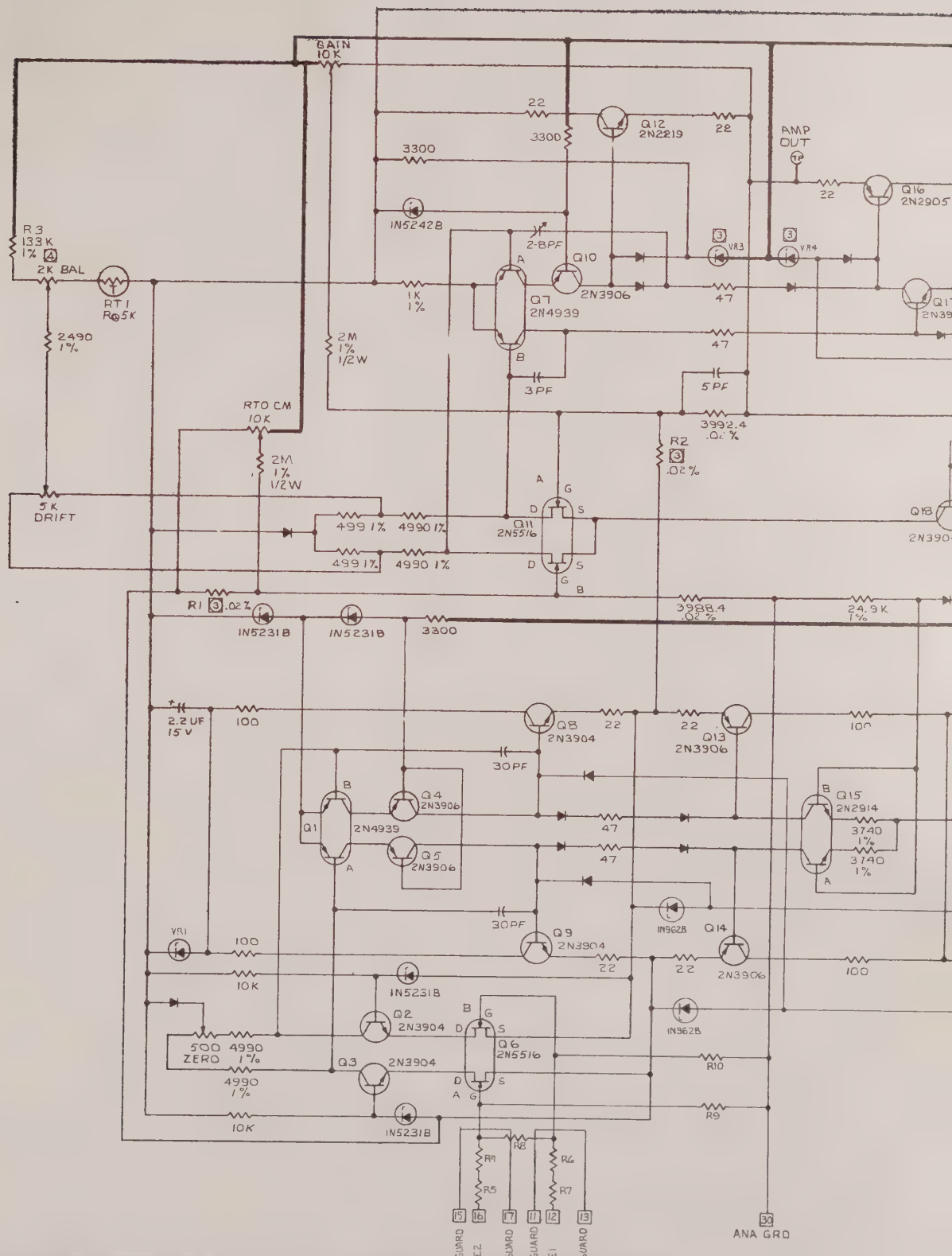
[illegible] GMD MUX AMPLIFIER [illegible]
[illegible] REV PRINTED [illegible]
[illegible]

[illegible]

ITEM	QTY	PART NO.	DESCRIPTION
010	1	58723-00	D&R ASSY GMD MUX AMPLIFIER C
020	10	521-00	RESISTOR 1/4W 10% 22
030	4	[illegible]	RESISTOR 1/4W 10% [illegible]
040	5	525-00	RESISTOR 1/4W 10% 100
050	2	529-00	RESISTOR 1/4W 10% 470
060	1	531-00	RESISTOR 1/4W 10% 1K
065	1	533-00	RESISTOR 1/4W 10% 2200
070	4	535-00	RESISTOR 1/4W 10% 3300
075	1	536-00	RESISTOR 1/4W 10% 4700
080	2	538-00	RESISTOR 1/4W 10% 10K
085	1	544-00	RESISTOR 1/4W 10% 47K
090	1	547-00	RESISTOR 1/4W 10% 100K
100	2	401-04	RESISTOR 1/4W 1% 402
110	2	402-02	RESISTOR 1/4W 1% 499
120	1	409-00	RESISTOR 1/4W 1% 1K
130	1	427-00	RESISTOR 1/4W 1% [illegible]
140	2	439-01	RESISTOR 1/4W 1% [illegible]
150	4	445-00	RESISTOR 1/4W 1% [illegible]
160	1	446-00	RESISTOR 1/4W 1% [illegible]
170	1	448-00	RESISTOR 1/4W 1% [illegible]
180	2	451-06	RESISTOR 1/4W 1% 7500
190	1	467-03	RESISTOR 1/4W 1% [illegible]
200	[illegible]	478-13	RESISTOR 1/4W 1% [illegible]
210	2	488-11	RESISTOR 1/2W 1% [illegible]
220	1	602-09	RESISTOR 2.75W 1% 560
230	[illegible]	[illegible]	RESISTOR .02% [illegible]
240	1	[illegible]	RESISTOR .02% [illegible]
250	1	374-02	THERMISTOR 5K
260	1	344-02	POTENTIOMETER [illegible]
270	1	346-00	POTENTIOMETER 2K
280	1	[illegible]	POTENTIOMETER 5K
290	2	[illegible]	POTENTIOMETER [illegible]
300	1	47-02	CAPACITOR [illegible]
310	1	48-00	CAPACITOR [illegible]
320	1	50-01	CAPACITOR 5PF
330	2	52-01	CAPACITOR 5% 10PF
340	2	56-01	CAPACITOR 5% [illegible]
350	2	61-01	CAPACITOR 10% [illegible]
360	1	79-01	CAPACITOR TRIMMER [illegible]
370	2	[illegible]	CAPACITOR 10% [illegible]
380	2	116-00	CAPACITOR [illegible]
390	2	[illegible]	CAPACITOR 20% [illegible]
400	2	142-01	CAPACITOR [illegible]
410	1	144-00	CAPACITOR 20% [illegible]
[illegible]	[illegible]	[illegible]	DIODE 1N4148
[illegible]	2	[illegible]	DIODE ZENER 1N962B
[illegible]	5	[illegible]	DIODE ZENER [illegible]
395	1	[illegible]	DIODE ZENER [illegible]
400	[illegible]	[illegible]	DIODE ZENER [illegible]
410	[illegible]	[illegible]	DIODE ZENER 1N5242B

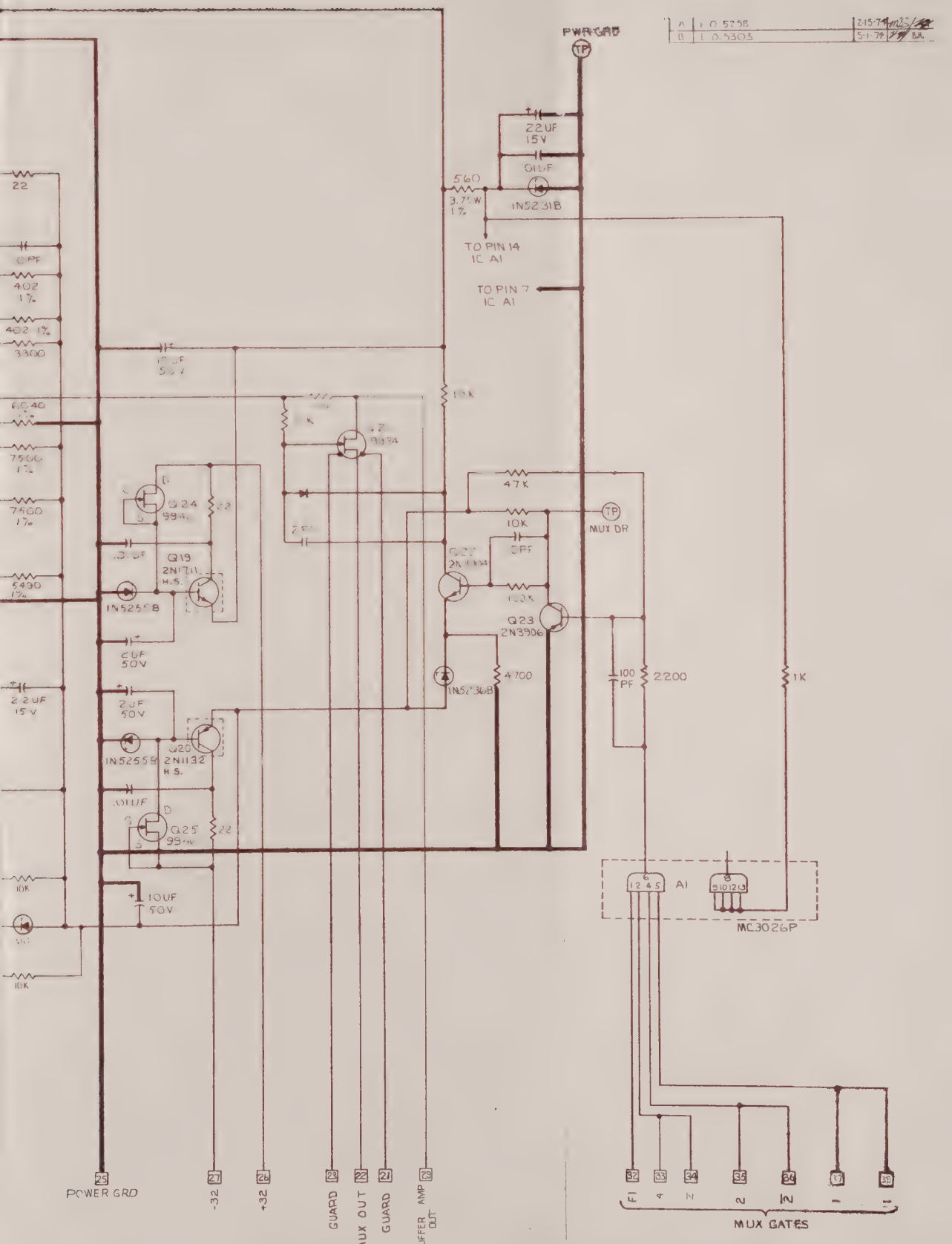
PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
	2	218-12	DIODE ZENER	1N5245B
	2	227-20	DIODE ZENER	1N5256B
	1	804-00	TRANSISTOR	2N1132
	1	808-00	TRANSISTOR	2N1711
	1	810-02	TRANSISTOR	2N2219A
	1	813-02	TRANSISTOR	2N2907A
	1	838-04	TRANSISTOR	2N2913
	1	846-00	TRANSISTOR	2N3904
	1	846-01	TRANSISTOR	2N3906
	2	846-08	TRANSISTOR	2N4921
	1	847-12	TRANSISTOR	2N5551
	1	847-01	TRANSISTOR SELECTED	9934
	2	9946-00	TRANSISTOR SELECT	A
	2	294-01	HEAT SINK	
	1	848-23	INTEGRATED CIRCUIT	MC3076P
	A/R	904-00	SILICONE GREASE	
	A/R	909-00	WIRE 22 AWG	



58721-06	100 V.F.S.	3988.4	3988.4	5240	5245	45K.0.02%	45K.0.02%	45K.0.02%	45K.0.02%	OMIT		10K,0.02%	10K,0.02%
58721-05	20 V.F.S.	3988.4	3988.4	5240	5245	STRAP	50K.0.02%	STRAP	STRAP	[illegible]		MIT	OMIT
58721-04	2 V.F.S.	3988.4	3988.4	5240	5226	470		470		OMIT		OMIT	OMIT
58721-03	1.192 VFS.	3247.3	3247.3	5239	5245	470		470		OMIT		OMIT	OMIT
58721-02	10.24 V.F.S.	4084	4084	5241	5245	470		470		OMIT		OMIT	OMIT
58721-01	10 V.F.S.	3988.4	3988.4	5240	5245	470		470		OMIT		OMIT	OMIT
58721-00	5 V.F.S.	1993	1993	5240	5234	470		470		OMIT		OMIT	OMIT
ORD. NO.	FUNTION	R1 VALUE	R2 VALUE	VR1 & VR2		R4	R5	R6	R7	R8		R9	R10

TABULATION



A	L 0.5258	2-15-74	
B	L 0.5303	5-1-74	B.H.

5. FOR DASH -00,-01,-02,-03,& -04 REPLACE R4 & R5 WITH 1,470 OHM 1/4W 10% RESISTOR. TYP FOR R6 & R7.
4. NOMINAL VALUE, TO BE SELECTED IN TEST
3. SEE TABULATION FOR VALUES.
2. ALL DIODES ARE 1N4148.
1. ALL RESISTORS ARE 1/4W 10%

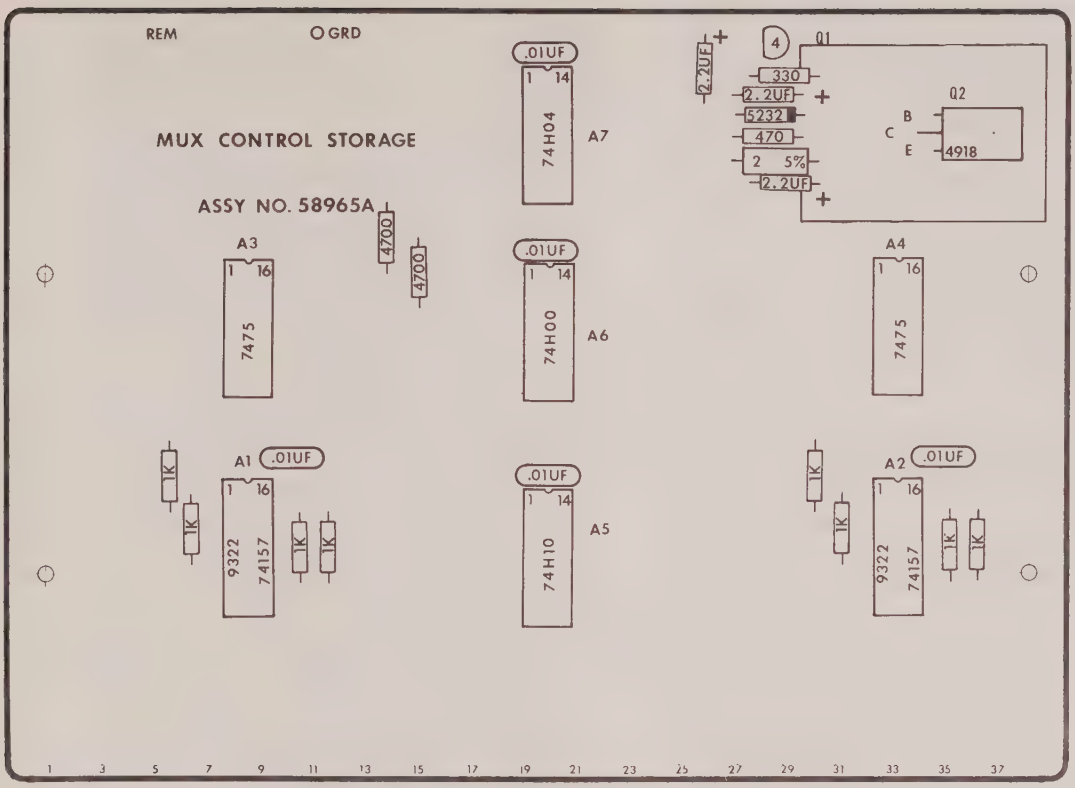
NOTES: UNLESS OTHERWISE SPECIFIED

DRAWN B. HEIDEMAN	1-11-74	TITLE SCHEMATIC DIAGRAM GMD MUX
CHK	1-11-74	
APPD		
APPD		

58720-T
NEXT ASSY

R

58721-



58950
NEXT ASSY

PRESTON SCIENTIFIC INCORPORATED Anaheim, Calif.

TITLE PRINTED CIRCUIT ASSY MUX CONTROL STORAGE

B 58965

SIZE CODE SH 1 OF 3

SCALE 2/1

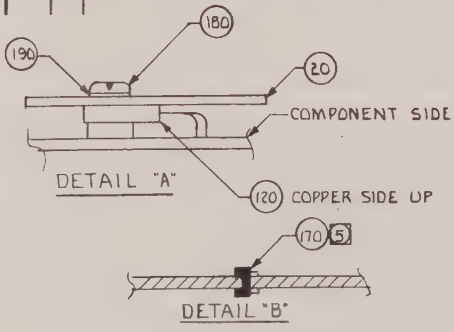
DRAWN M.J.S. 10-29-73

ENGR

APPD

APPD

ABBREVIATIONS PER MIL-STD-12



5 INSTALL WIRE (ITEM 170) IN HOLES WITH CIRCUITRY. ON COMPONENT SIDE & SOLDER BOTH SIDES PER DETAIL "B".
4. FOR HEATSINK ASSY SEE DETAIL "A".
3. ALL RESISTORS ARE 1/4W 10%
2. FOR P/L SEE SH 3 OF 3.
1. FOR SCHEMATIC DIAGRAM SEE 58966.

NOTE: UNLESS OTHERWISE SPECIFIED

BY	DATE	TITLE	PRESTON
DRAWN M.J.S.	10-29-73	PRINTED CIRCUIT ASSY MUX CONTROL STORAGE	SCIENTIFIC INCORPORATED 805 East Cerritos Ave., Anaheim, Calif. 92805 Tel. (714) 776-6400
CHK	11-19-73		
ENGR	11-01-73	MATERIAL	
APPD			
APPD		FINISH	
58950		SCALE	SIZE A CODE SH 2 OF 3
NEXT ASSY			58965

REVISIONS

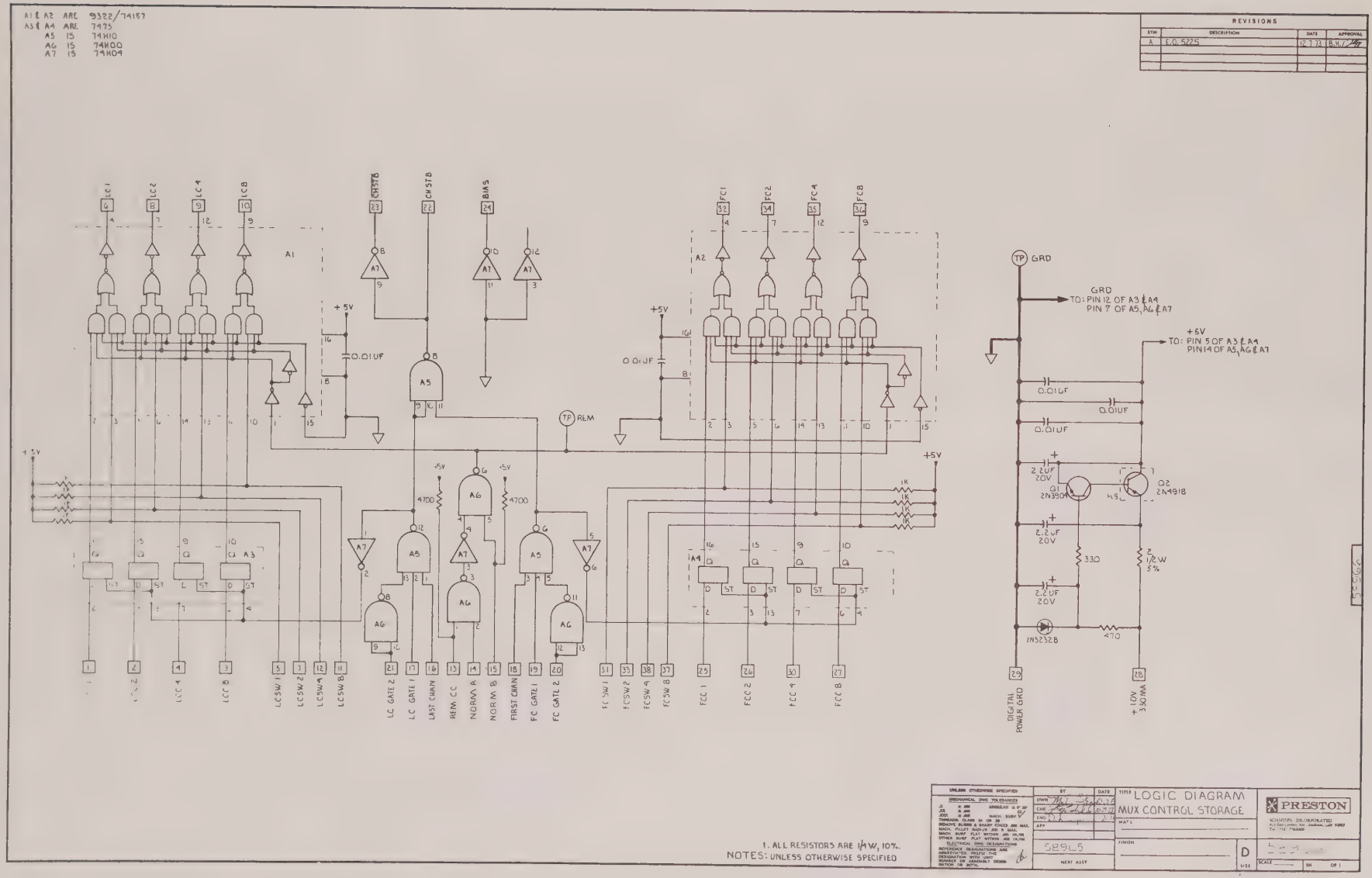
ZONE	LTR	DESCRIPTION	DATE	APPROVED

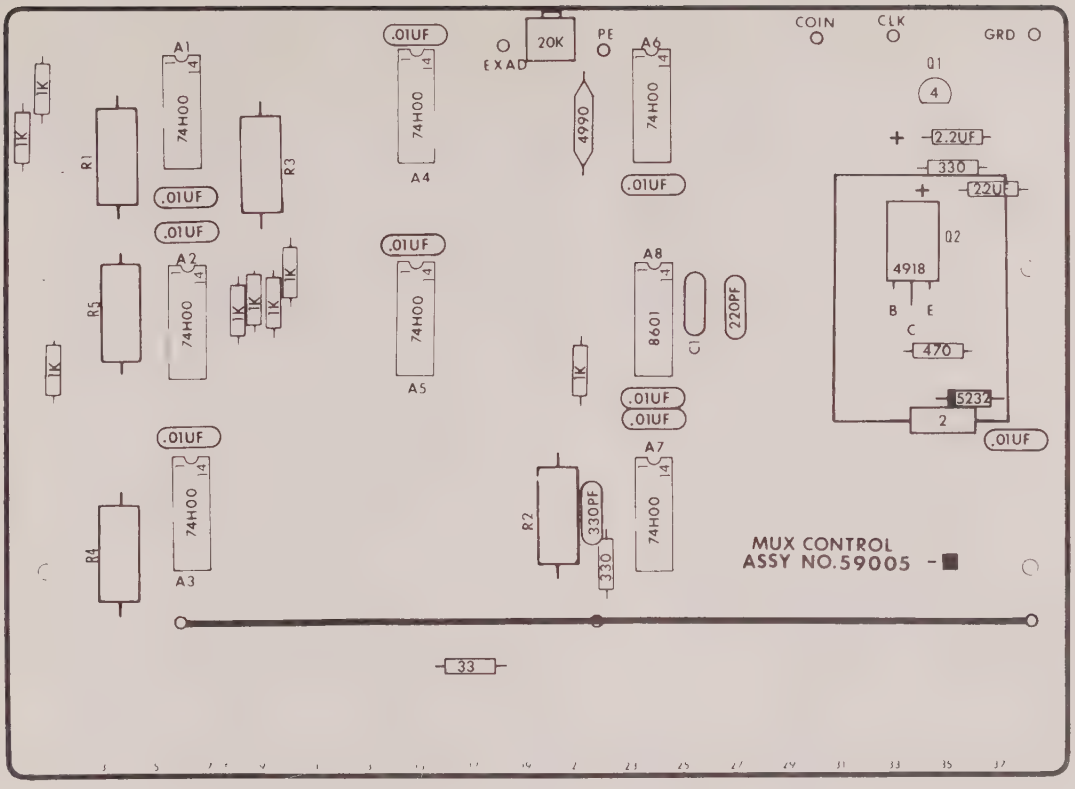
TITLE: P.C. ASSY MUX CONTROL STORAGE
DWG NO. 58965-00 REV A
SHEET 3 OF 3

PRESTON SCIENTIFIC INC.
PRINTED 12/11/73

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
010	1	58968-00	D&R ASSY MUX CONTROL STORAGE C
020	1	46079-00	HEATSINK A
040	1	528-00	RESISTOR 1/4W 10% 330
050	1	529-00	RESISTOR 1/4W 10% 470
060	8	531-00	RESISTOR 1/4W 10% 1K
065	2	536-00	RESISTOR 1/4W 10% 4700
070	1	558-06	RESISTOR 1/2W 5% 2
080	5	93-01	CAPACITOR 10% .01UF
090	3	131-00	CAPACITOR 20% 2.2UF 20V
100	1	244-08	DIODE ZENER 1N5232B
110	1	846-00	TRANSISTOR 2N3904
120	1	846-10	TRANSISTOR 2N4918
130	2	848-27	INTEGRATED CIRCUIT 7475
135	1	848-48	INTEGRATED CIRCUIT 74H10
140	1	848-14	INTEGRATED CIRCUIT 74H00
145	2	848-58	INTEGRATED CIRCUIT 74157
150	1	848-40	INTEGRATED CIRCUIT 74H04
160	A/R	904-00	SILICONE GREASE
170	A/R	989-00	WIRE 22 AWG
180	1	665-00	SCREW PHMS 4-40 X 5/16
190	1	859-00	WASHER SHOULDER #4 NYLON


A1 & A2 ARE 9322/74157
A3 & A4 ARE 7475
A5 15 74H10
A6 15 74H00
A7 15 74H04
REVISIONS
SYM DESCRIPTION DATE APPROVAL
A E.O. 5225 12 7 73 B.H.
LC1 LC2 LC4 LC8
CH STB
BIAS
FC1 FC2 FC4 FC8
A1
A2
A3
A4
A5
A6
A7
+5V
0.01UF
TP REM
TP GRD
GRD
TO: PIN 12 OF A3 & A4
PIN 7 OF A5, A6 & A7
+5V
TO: PIN 5 OF A3 & A4
PIN 14 OF A5, A6 & A7
2.2UF 20V
Q1 2N3904
Q2 2N4918
330
2 1/2W 5%
1N5232B
470
1K
4700
LCSW 1
LCSW 2
LCSW 4
LCSW 8
LC GATE 2
LC GATE 1
LAST CHAN
REM CC
NORM A
NORM B
FIRST CHAN
FC GATE 1
FC GATE 2
FCSW 1
FCSW 2
FCSW 4
FCSW 8
FCC 1
FCC 2
FCC 4
FCC 8
DIGITAL POWER GRD
+10V 330MA
1. ALL RESISTORS ARE 1/4W, 10%.
NOTES: UNLESS OTHERWISE SPECIFIED
UNLESS OTHERWISE SPECIFIED
MECHANICAL DWG TOLERANCES
ELECTRICAL DWG DESIGNATIONS
REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.
BY DATE
DWN
CHK
ENG
APP
TITLE LOGIC DIAGRAM
MUX CONTROL STORAGE
MAT'L
FINISH
D
SIZE
SCALE
SH OF 1
NEXT ASSY
PRESTON
SCIENTIFIC INCORPORATED
58965



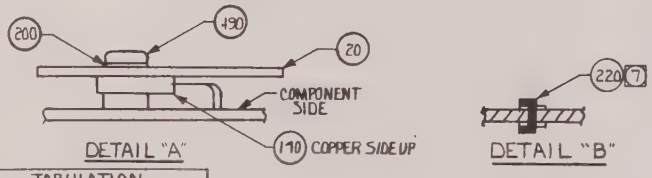
PRESTON SCIENTIFIC INCORPORATED

TITLE	PRINTED CIRCUIT ASSY MUX CONTROL
MATERIAL	
FINISH	
SIZE	
CODE	59005-T
SH 1, OF 3	
SCALE 2/1	
NEXT ASSY	58700

	BY	DATE
DRAWN	M. J. Stein	7.10.74
CHK		7-10-74
ENG		7.11.74
APPD		
APPD		

ABBREVIATIONS PER MIL-STD-12

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHEET ONE		



TABULATION	
DASH NO	R1 THRU R5
59005-00	OMIT

7. INSTALL WIRE (ITEM 220) IN HOLES WITH CIRCUITRY ON COMPONENT SIDE & SOLDER BOTH SIDES SEE DETAIL "B"
6. FOR HEATSINK ASSY SEE DETAIL "A".
5. FOR R1 THRU R5 VALUES SEE TABULATION.
4. C1 VALUE TO BE SELECTED IN TEST.
3. ALL RESISTORS ARE 1/4W, 10%.
2. FOR PARTS LIST SEE SH. 3 OF 3.
1. FOR SCHEMATIC DIAGRAM SEE DWG.NO. 59006-T

NOTE: UNLESS OTHERWISE SPECIFIED

BY	DATE
DWN M. J. Stein	7.10.74
CHK	7-10-74
ENG	7.11.74
APP	

TITLE	PRINTED CIRCUIT ASSY MUX CONTROL
MAT'L	
FINISH	
SIZE	A
58700 NEXT ASSY	59005-T
SCALE	SH 2 OF 3

PRESTON SCIENTIFIC INCORPORATED
8103 East Commerce Ave Anaheim Calif 92805
Tel (714) 776-6400

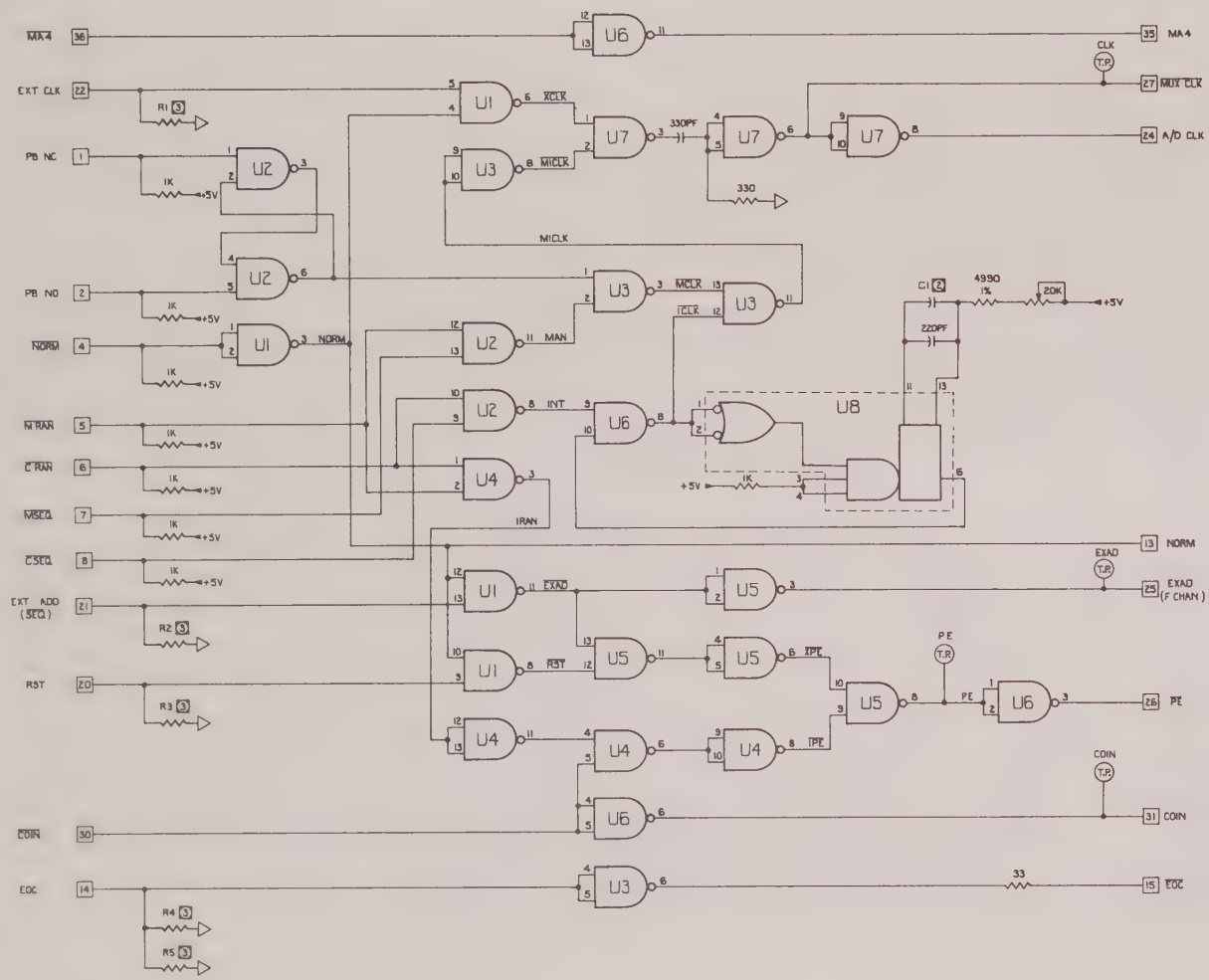
TITLE: P.C. ASSY MUX CONTROL
DWG NO. 59005-00 REV _____
SHEET 2 OF 3

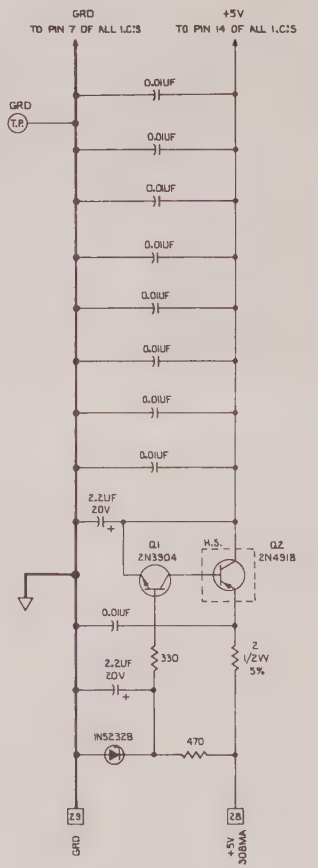
PRESTON SCIENTIFIC INC
PRINTED 7/10/74

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	59008-00	D&R ASSY MUX CONTROL	C
020	1	46079-00	HEATSINK	A
025	1	522-00	RESISTOR 1/4W 10% 33	
030	2	528-00	RESISTOR 1/4W 10% 330	
040	1	529-00	RESISTOR 1/4W 10% 470	
050	8	531-00	RESISTOR 1/4W 10% 1K	
060	1	445-00	RESISTOR 1/4W 1% 4990	
070	1	558-06	RESISTOR 1/2W 5% 2	
080	1	360 03	POTENTIOMETER 20K	
085	1	67-01	CAPACITOR 10% 220PF	
090	1	68-03	CAPACITOR 10% 330PF	
100	9	93-01	CAPACITOR 10% .01UF	
110	2	131-00	CAPACITOR 20% 2.2UF 20V	
120	1	244-08	DIODE ZENER 1N5232B	
130	1	846-00	TRANSISTOR 2N3904	
140	1	846-10	TRANSISTOR 2N4918	
150	1	848-98	INTEGRATED CIRCUIT 8601	
160	7	848-14	INTEGRATED CIRCUIT 74H00	
180	A/R	994-11	WIRE 22 AWG	
190	1	665-00	SCREW PHMS 4-40 X 5/16	
200	1	859-02	WASHER SHOULDER NYLON	
210	A/R	904-00	SILICONE GREASE	
220	A/R	989-00	WIRE 22 AWG	

U1 THRU U7 ARE 74H00
U8 IS AN 8601





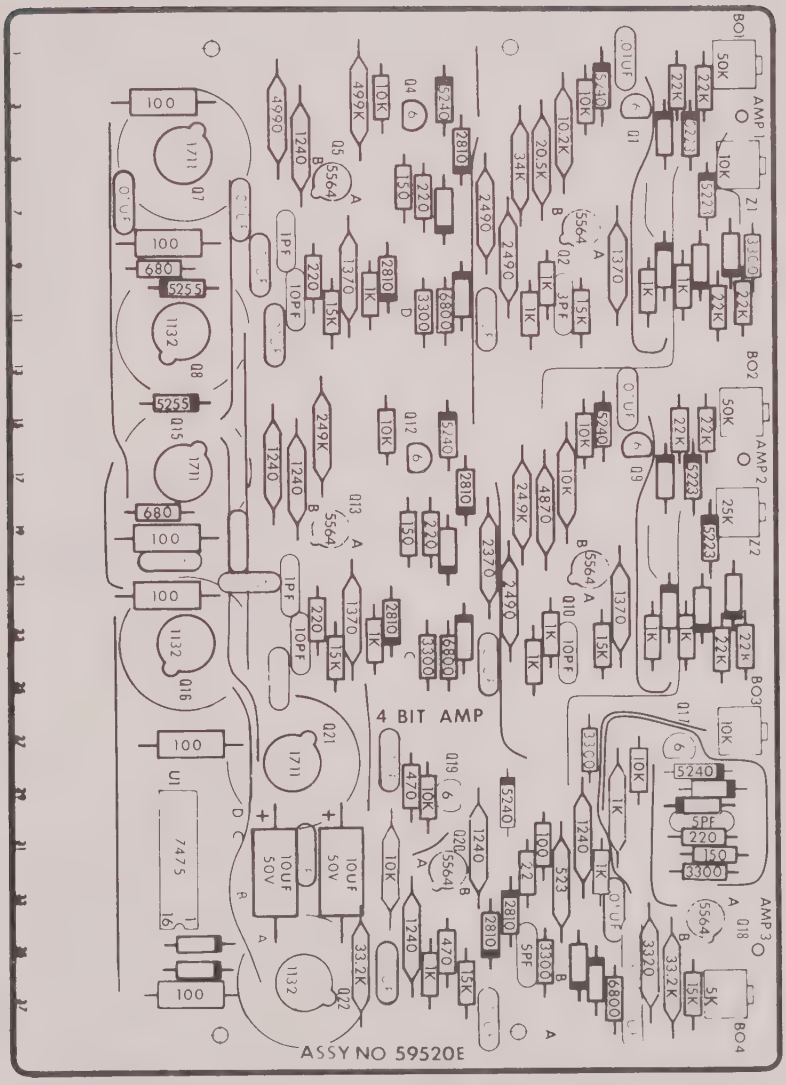
[3] FOR R1 THRU R5 VALUES SEE TABULATION.
[2] C1 TO BE SELECTED IN TEST.
L ALL RESISTORS ARE 1/4W, 10%.
NOTE: UNLESS OTHERWISE SPECIFIED.

59006-00 DASH NO.	R1	R2	R3	R4	R5
	OMIT	OMIT	OMIT	OMIT	OMIT

TABULATION

REVISIONS

BY	DATE	TITLE
DWN M.J STEM	7.10.74	SCHEMATIC DIAGRAM MUX CONTROL
CHK H.C LOTZE	7.10.74	
ENG D.L. SIMMONS	7.11.74	
APP		
MATL		PRESTON
59005-T NEXT ASSY	FINISH	D SIZE 59006-T



	PRINTED CIRCUIT ASSY 4 BIT AMP	PRESTON	
	B	59520	

02565

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHEET ONE		

6. INSTALL HEAT SINK (ITEM 390) ON TRANSISTORS Q7, Q8, Q15, Q16, Q21 & Q22 USING SILICONE GREASE (ITEM 410).
5. WIRE POINT TO POINT A TO A, B TO B, C TO C & D TO D.
4. FOR PARTS LIST SEE SHEET 3 & 4 OF 4.
3. FOR SCHEMATIC DIAGRAM SEE DWG NO. 59521.
2. ALL DIODES ARE IN4148.
1. ALL RESISTORS ARE 1/4W 10%
NOTE: UNLESS OTHERWISE SPECIFIED.

BY	DATE
DWN BREITENSTEIN	10-16-75
CHK	10/17/75
ENG	10/20/75
APP	

TITLE: PRINTED CIRCUIT ASSY 4 BIT AMP

MAT'L

FINISH

PRESTON SCIENTIFIC INCORPORATED
805 East Cerritos Ave., Anaheim Calif 92805
Tel (714) 776-6400

56080 NEXT ASSY

A SIZE

59520

SCALE

SH 2 OF 4

TITLE: P.C. ASSY 4 BIT AMP
DWG NO 59520-00 REV E
SHEET 3 OF 4

PRESTON SCIENTIFIC INC.
PRINTED 08/11/76

PARTS LIST

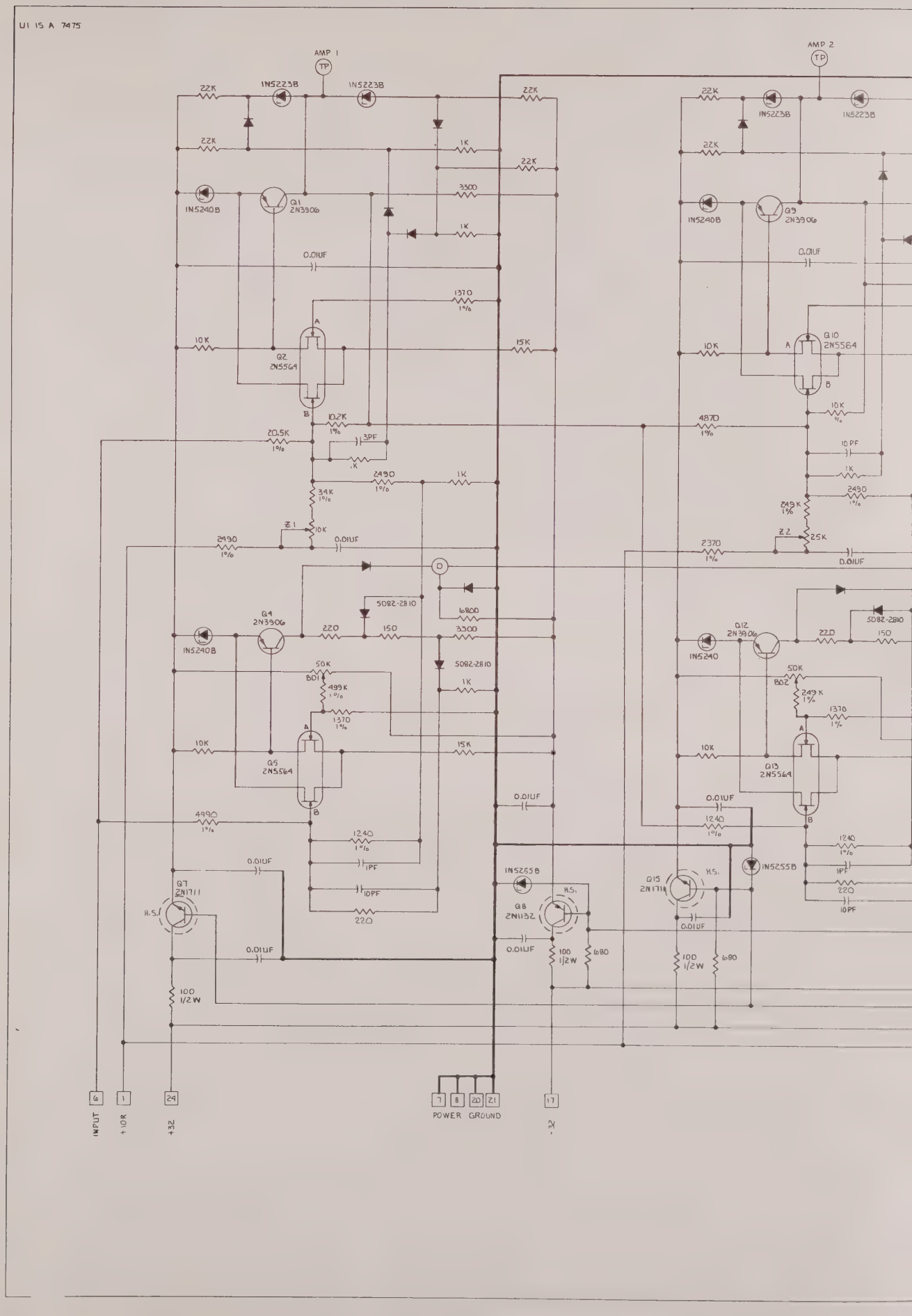
ITEM	QTY	PART NO.	DESCRIPTION	
10	1	59523-00	D&R ASSY 4 BIT AMP	C
30	1	521-00	RESISTOR 1/4W 10%	22
40	1	525-00	RESISTOR 1/4W 10%	100
50	3	525-03	RESISTOR 1/4W 10%	150
60	5	527-00	RESISTOR 1/4W 10%	220
65	2	529-00	RESISTOR 1/4W 10%	470
70	2	530-00	RESISTOR 1/4W 10%	680
80	12	531-00	RESISTOR 1/4W 10%	1K
100	6	535-00	RESISTOR 1/4W 10%	3300
110	3	537-00	RESISTOR 1/4W 10%	6800
120	6	538-00	RESISTOR 1/4W 10%	10K
130	6	540-00	RESISTOR 1/4W 10%	15K
140	8	541-00	RESISTOR 1/4W 10%	22K
160	6	565-00	RESISTOR 1/2W 10%	100
162	1	402-01	RESISTOR 1/4W 1%	523
164	1	409-00	RESISTOR 1/4W 1%	1K
166	6	413-00	RESISTOR 1/4W 1%	1240
170	4	414-00	RESISTOR 1/4W 1%	1370
175	1	425-00	RESISTOR 1/4W 1%	2370
180	3	427-00	RESISTOR 1/4W 1%	2490
183	1	436-02	RESISTOR 1/4W 1%	3320
185	1	444-00	RESISTOR 1/4W 1%	4870
190	1	445-00	RESISTOR 1/4W 1%	4990
195	1	456-01	RESISTOR 1/4W 1%	10.2K
200	2	456-03	RESISTOR 1/4W 1%	10K
210	1	465-05	RESISTOR 1/4W 1%	20.5K
215	1	467-03	RESISTOR 1/4W 1%	24.9K
218	2	469-00	RESISTOR 1/4W 1%	33.2K
220	1	469-01	RESISTOR 1/4W 1%	34K
222	1	479-02	RESISTOR 1/4W 1%	249K
224	1	484-00	RESISTOR 1/4W 1%	499K
230	1	351-80	POTENTIOMETER	5K
234	2	358-80	POTENTIOMETER	10K
235	1	361-01	POTENTIOMETER	25K
236	2	369-02	POTENTIOMETER	50K
240	4	244-03	DIODE ZENER	1N5223B
250	6	248-10	DIODE ZENER	1N5240B
260	2	247-20	DIODE ZENER	1N5255B
270	18	239-00	DIODE	1N4148
275	6	248-22	DIODE	5082-2810
280	2	47-01	CAPACITOR	1PF
290	1	48-00	CAPACITOR	3PF
300	2	50-01	CAPACITOR	5PF
310	3	52-01	CAPACITOR 5%	10PF
320	19	93-01	CAPACITOR 10%	.01UF
330	2	142-01	CAPACITOR	10UF 50V
340	3	828-00	TRANSISTOR	2N1711
350	3	824-00	TRANSISTOR	2N1132
370	6	846-01	TRANSISTOR	2N3906
375	6	847-15	TRANSISTOR	2N5564

TITLE: P.C. ASSY 4 BIT AMP
DWG NO 59520-00 REV E
SHEET 4 OF 4

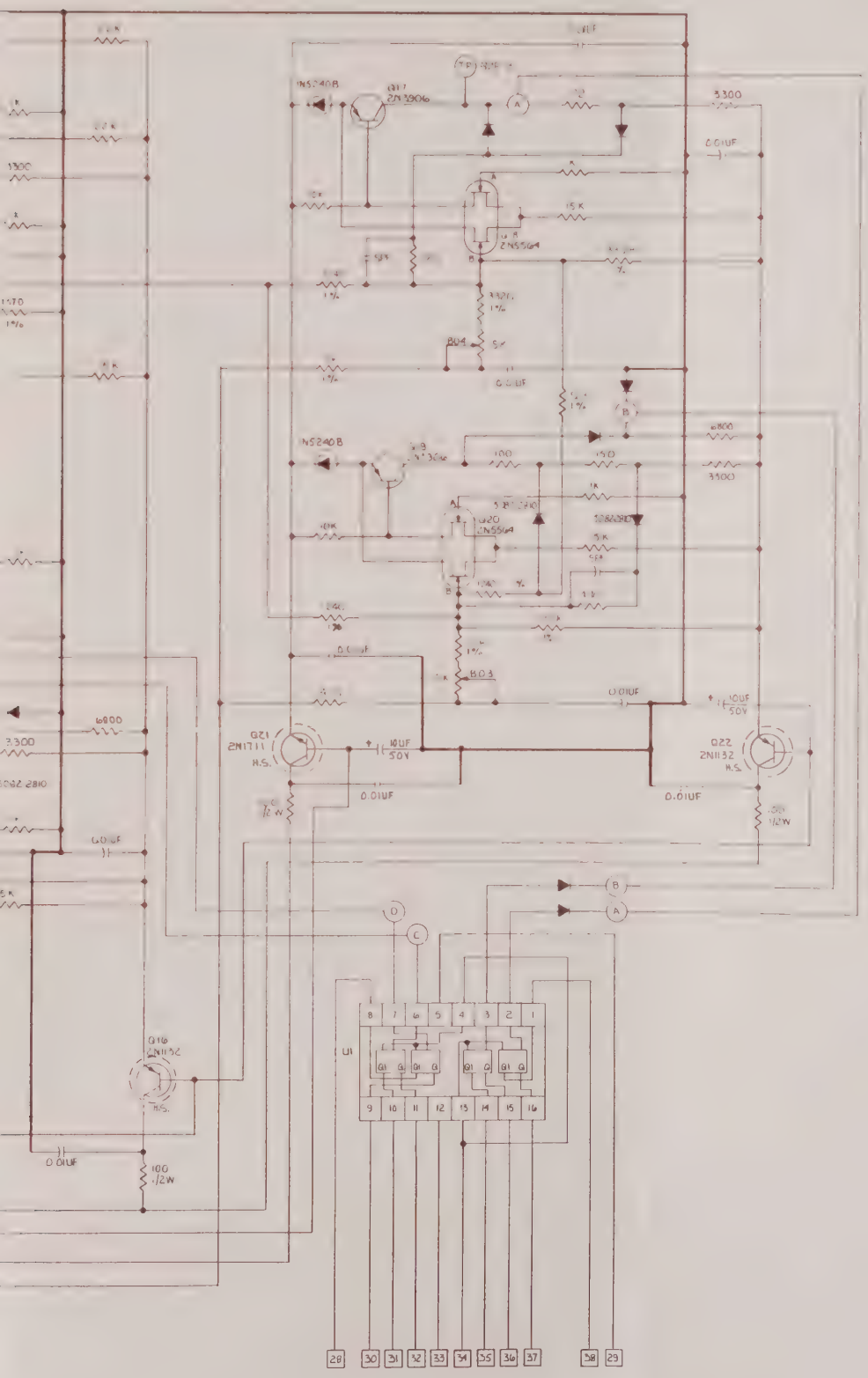
PRESTON SCIENTIFIC INC
PRINTED 08/11/76

PARTS LIST

ITEM	QTY	PART NO	DESCRIPTION
380	1	848-27	INTEGRATED CIRCUIT 7475
390	6	284-01	HEAT SINK
410	A/R	904-00	SILICONE GREASE


U1 IS A 7475
AMP 1
TP
AMP 2
TP
22K
1N5223B
1N5223B
22K
1K
22K
3300
1N5240B
Q1
2N3906
1K
0.01UF
1370
1%
10K
Q2
2N5564
15K
10.2K
1%
20.5K
1%
3PF
1K
2490
1%
1K
34K
1%
Z1
10K
2490
1%
0.01UF
D
5082-2810
6800
Q4
2N3906
220
150
3300
1N5240B
50K
B01
499K
1%
5082-2810
1K
1370
1%
10K
Q5
2N5564
15K
4990
1%
1240
1%
1PF
10PF
220
0.01UF
Q7
2N1711
H.S.
0.01UF
100
1/2W
1N5255B
Q8
2N1132
H.S.
0.01UF
100
1/2W
680
22K
1N5223B
1N5223B
22K
1N5240B
Q9
2N3906
0.01UF
10K
Q10
2N5564
10K
4870
1%
10PF
1K
2490
1%
249K
1%
Z2
25K
2370
1%
0.01UF
Q12
2N3906
1N5240
220
150
5082-2810
50K
B02
249K
1%
1370
1%
10K
Q13
2N5564
0.01UF
1240
1%
1N5255B
Q15
2N1711
H.S.
0.01UF
100
1/2W
680
1240
1%
1PF
220
10PF
6
1
24
7
8
20
21
17
INPUT
+10R
+32
POWER GROUND
-32

REVISIONS			
A	PRE RELEASE REVISION FOR BIO	10-24-75	
B	E.O. 5640	12-4-75	
C	E.O. 5664	1-6-76	
D	E.O. 5768	6-22-76	
E	E.O. 5785	8-11-76	

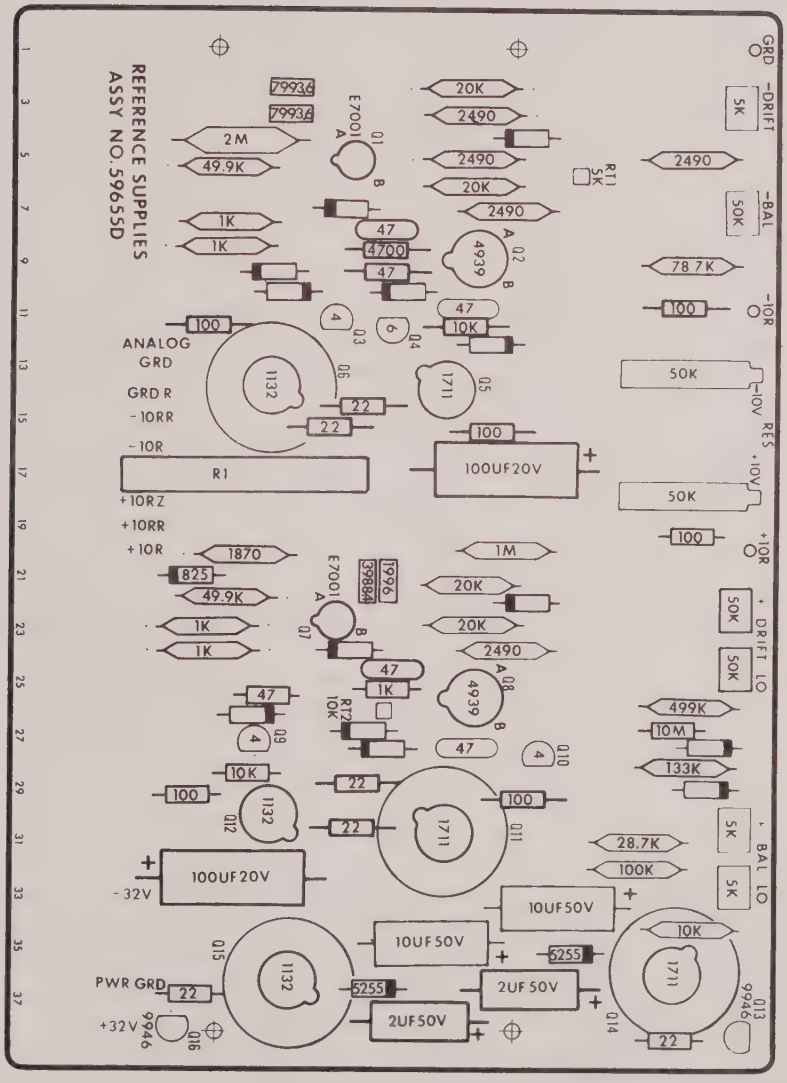


1. ALL RESISTORS ARE 1/4W 10%
NOTE: UNLESS OTHERWISE SPECIFIED.

BREITENSTEIN 10-17-75	SCHEMATIC DIAGRAM 4 BIT AMP	PRESTON	
59520		59521	

REV	E.O. NO.	DATE	APPD
A	PRR	[illegible]	[illegible]
B	5074		[illegible]
C	5231	1-3-74	[illegible]
D	5322	6-6-74	[illegible]

REDUCE THIS LINE TO 1.00



BY	DATE	TITLE		
DRAWN WNK 02	11 16 72	PRINTED CIRCUIT ASSY REFERENCE SUPPLIES	PRESTON	FOR NOTES SEE SH 2.
CHK		MATERIAL		
ENGR				
APPD		FINISH	59655	
APPD		SCALE 2/1	SIZE	NEXT ASSY

ABBREVIATIONS PER MIL STD 12

MASTER # 56

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

5. FOR PARTS LIST SEE SH 2 OF 4.
4. R1 TO BE SELECTED IN TEST. SEE SH 4 OF 4.
3. FOR SCHEMATIC DIAGRAM SEE DWG. 59656.
2. ALL DIODES ARE IN4148.
1. ALL RESISTORS ARE 1/4W 10%

NOTE: UNLESS OTHERWISE SPECIFIED

BY	DATE	TITLE	PRESTON SCIENTIFIC INCORPORATED
DRAWN	11-16-72	PRINTED CIRCUIT ASSY REFERENCE SUPPLIES	
CHK	11-27-72		
ENGR		MATERIAL	
APPD	12-4-72		
APPD		FINISH	A 59655
NEXT ASSY		SCALE	SIZE CODE SH 2 OF 4

TITLE: P.C. ASSY REFERENCE SUPPLIES — PRESTON SCIENTIFIC INC
DWG NO. 59655 00 REV -D- — PRINTED 6/05/74
SHEET 2 OF 4

PARTS LIST

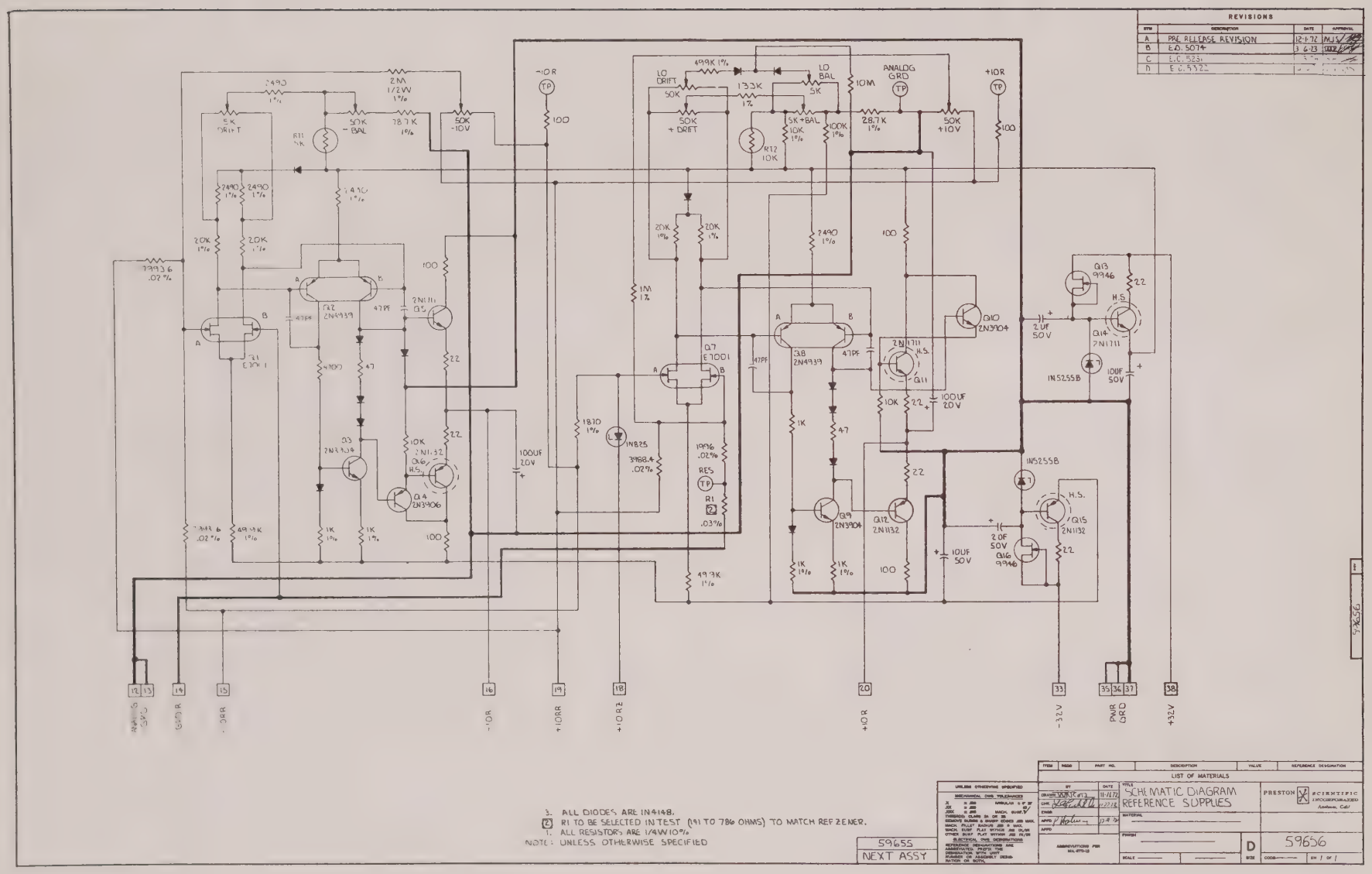
ITEM	QTY	PART NO.	DESCRIPTION			
010	1	59658-00	D&R ASSY REF SUPPLIES			C
040	6	521-00	RESISTOR 1/4W	10%	22	
050	2	523-00	RESISTOR 1/4W	10%	47	
060	6	525-00	RESISTOR 1/4W	10%	100	
070	1	531-00	RESISTOR 1/4W	10%	1K	
090	1	536-00	RESISTOR 1/4W	10%	4700	
100	2	538-00	RESISTOR 1/4W	10%	10K	
101	1	555-01	RESISTOR 1/4W	10%	10M	
110	4	409-00	RESISTOR 1/4W	1%	1K	
111	1	421-00	RESISTOR 1/4W	1%	1870	
140	5	427-00	RESISTOR 1/4W	1%	2490	
141	1	456-03	RESISTOR 1/4W	1%	10K	
145	4	465-02	RESISTOR 1/4W	1%	20K	
146	1	467-01	RESISTOR 1/4W	1%	28.7K	
150	2	472-25	RESISTOR 1/4W	1%	49.9K	
160	1	475-02	RESISTOR 1/4W	1%	78.7K	
161	1	478-00	RESISTOR 1/4W	1%	100K	
162	1	478-16	RESISTOR 1/4W	1%	133K	
163	1	484-00	RESISTOR 1/4W	1%	499K	
164	1	488-16	RESISTOR 1/4W	1%	1M	
170	1	488-11	RESISTOR 1/2W	1%	2M	
180	1	998-20	RESISTOR	.02%	1996	
190	1	998-25	RESISTOR	.02%	3988.4	
200	2	998-46	RESISTOR	.02%	7993.6	
220	1	374-02	THERMISTOR		5K	
221	1	374-05	THERMISTOR		10K	
230	3	351-80	POTENTIOMETER		5K	
240	3	369-02	POTENTIOMETER		50K	
250	2	372-03	POTENTIOMETER		50K	
270	4	58-01	CAPACITOR	10%	47PF	
280	2	116-00	CAPACITOR		2UF 50V	
290	2	142-01	CAPACITOR		10UF 50V	
300	2	147-01	CAPACITOR	20%	100UF 20V	
310	2	247-20	DIODE ZENER		1N5255B	
320	1	238-00	DIODE ZENER		1N825	
330	13	239-00	DIODE		1N4148	
340	3	824-00	TRANSISTOR		2N1132	
350	3	828-00	TRANSISTOR		2N1711	
360	3	846-00	TRANSISTOR		2N3904	
361	1	846-01	TRANSISTOR		2N3906	
370	2	846-08	TRANSISTOR		2N4939	
380	2	845-10	TRANSISTOR		E7001	
390	2	9946-00	TRANSISTOR SELECT			A
391	4	284-01	HEAT SINK			

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

59655 - SELECTION OF R1

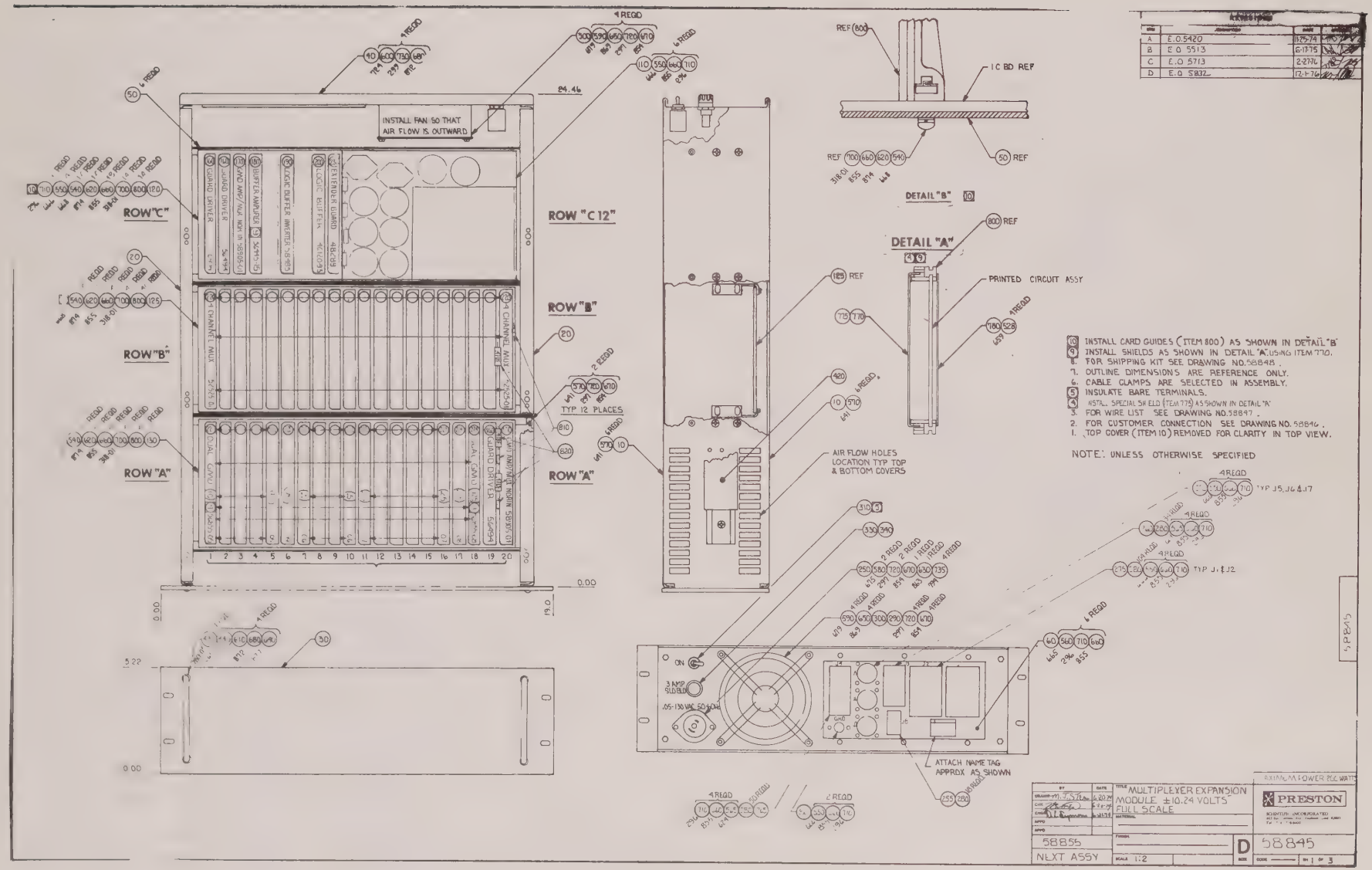
1. SET ALL POTENTIOMETERS TO APPROXIMATE CENTER OF RANGE
2. INSTALL A PRECISION RESISTOR SUBSTITUTION BOX BETWEEN RES TP AND ANALOG GRD TP
3. MONITOR THE VOLTAGE AT +10R TP, ADJUST THE RESISTOR SUBSTITUTION BOX IN ONE OHM STEPS UNTIL APPROXIMATELY +10.000 VOLTS IS READ ON A DVM. RESISTOR SHOULD BE BETWEEN 142 AND 787 OHMS
4. TURN THE +10V POTENTIOMETER OVER ITS RANGE AND NOTE THAT THE VOLTAGE CAN BE ADJUSTED APPROXIMATELY EQUALLY EACH SIDE OF +10.000 VOLTS.
5 IF NOT, READJUST THE RESISTOR SUBSTITUTION BOX IN ONE OHM STEPS UNTIL THE CONDITIONS OF STEP 4 ARE MET
6. READ THE RESISTOR SUBSTITUTION BOX. INSTALL THE EQUIVALENT RESISTOR ± 2 OHMS ± .03% IN THE R1 POSITION

BY	DATE	TITLE	PRESTON SCIENTIFIC INCORPORATED
DRAWN	11-27-72	REFERENCE SUPPLY R-1 SELECTION	
CHK	11-27-72		
ENGR		MATERIAL	59655
APPD	12-4-72		
APPD		FINISH	A 59655
NEXT ASSY		SCALE	SIZE CODE SH 4 OF 4



3. ALL DIODES ARE IN4148.
2. R1 TO BE SELECTED IN TEST (191 TO 786 OHMS) TO MATCH REF ZENER.
1. ALL RESISTORS ARE 1/4W 10%
NOTE: UNLESS OTHERWISE SPECIFIED

DRAWING NUMBER	DESCRIPTION
58845	TOP ASSEMBLY
58846	CUSTOMER CONNECTION
58847	WIRE LIST
58836	INTERCONNECT BOARD A
58838	INTERCONNECT BOARD B
58858	INTERCONNECT BOARD C
46120	LOGIC BUFFER
46121	SCHEMATIC
52525	GMM MULTIPLEXER
52526	SCHEMATIC
56445	BUFFER AMPLIFIER
56446	SCHEMATIC
56494	GUARD DRIVER
56495	SCHEMATIC
56855	DUAL GMD MUX
56856	SCHEMATIC
58485	LOGIC BUFFER
58486	SCHEMATIC
58905	GMD AMP/MUX NOR IN
58906	SCHEMATIC
58935	POWER SUPPLY
58936	SCHEMATIC



INSTALL FAN SO THAT AIR FLOW IS OUTWARD
ROW "C"
ROW "B"
ROW "A"
ROW "C 12"
ROW "B"
ROW "A"
GUARD DRIVER
BUFFER AMPLIFIER
LOGIC BUFFER INVERTER
EXTENDER GUARD
4 CHANNEL MUX
TYP 12 PLACES
DETAIL "B"
DETAIL "A"
I C BD REF
PRINTED CIRCUIT ASSY
AIR FLOW HOLES LOCATION TYP TOP & BOTTOM COVERS
ATTACH NAME TAG APPROX AS SHOWN
3 AMP SLO BLO
ON
TYP J5, J6 & J7
TYP J1 & J2
10 INSTALL CARD GUIDES (ITEM 800) AS SHOWN IN DETAIL "B"
9 INSTALL SHIELDS AS SHOWN IN DETAIL "A" USING ITEM 770.
8. FOR SHIPPING KIT SEE DRAWING NO. 58848.
7. OUTLINE DIMENSIONS ARE REFERENCE ONLY.
6. CABLE CLAMPS ARE SELECTED IN ASSEMBLY.
5 INSULATE BARE TERMINALS.
4 INSTALL SPECIAL SHIELD (ITEM 775) AS SHOWN IN DETAIL "A"
3. FOR WIRE LIST SEE DRAWING NO. 58847.
2. FOR CUSTOMER CONNECTION SEE DRAWING NO. 58846.
1. TOP COVER (ITEM 10) REMOVED FOR CLARITY IN TOP VIEW.
NOTE: UNLESS OTHERWISE SPECIFIED
A E.O. 5420 11-25-74
B E.O. 5513 6-17-75
C E.O. 5713 2-27-76
D E.O. 5832 12-1-76
MULTIPLEXER EXPANSION MODULE ±10.24 VOLTS FULL SCALE
PRESTON
58855
NEXT ASSY
D 58845
SCALE 1:2
SH 1 OF 3

TITLE: MULTIPLEX EXPANSION MODULE
DWG NO. 58845-00 REV .D....
SHEET..2 OF.3..

PRESTON SCIENTIFIC INC.
PRINTED 12/01/76

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
10	2	51983-00	COVER TOP & BOTTOM	D
20	2	51982-00	PANEL SIDE	D
30	1	59999-26	PANEL FRONT GMD	D
40	1	40456-03	PANEL REAR 3 AMP	A
50	6	40457-00	SUPPORT INTERCONNECT	C
60	1	58844-00	PLATE CONNECTOR	B
70	1	58848-00	SHIPPING KIT	A
80	1	55742-00	FEED THRU TERMINAL ASSY	B
110	1	58935-00	P.C. ASSY POWER SUPPLY	AP
120	1	58859-00	D&R ASSY INTERCONNECT BD C	C
125	1	58839-00	D&R. ASSY INTERCONNECT BD B	C
130	1	58837-00	D&R ASSY INTERCONNECT BD A	C
160	3	56494-00	P.C. ASSY GUARD DRIVER	AP
170	2	58905-01	P.C. ASSY GMD AMP/MUX NOR IN	AP
180	1	56445-15	P.C. ASSY BUFFER AMPLIFIER	AP
190	1	58485-00	P.C. ASSY LOGIC BUFFER	AP
200	1	46120-93	P.C. ASSY LOGIC BUFFER	AP
220	20	52525-01	P.C. ASSY 4 CHANNEL MUX	AP
221	5	56855-05	P.C. ASSY DUAL GMD (10)	AP
222	4	56855-06	P.C. ASSY DUAL GMD (.5)	AP
223	6	56855-07	P.C. ASSY DUAL GMD (.25)	AP
224	2	56855-08	P.C. ASSY DUAL GMD (.125)	AP
225	1	56855-09	P.C. ASSY DUAL GMD (.75)	AP
230	1	48289-00	D&R ASSY EXTENDER	C
250	1	182-02	CONNECTOR FLANGED INLET	
255	1	161-01	CONNECTOR 18 SOCKET	
260	1	165-00	CONNECTOR 34 SOCKET	
265	1	167-00	CONNECTOR 50 SOCKET	
270	3	178-00	CONNECTOR 5 SOCKET	
275	2	172-02	CONNECTOR 104 SOCKET	
280	310	332-00	CONTACT SOCKET	
290	1	256-04	FAN	
300	2	257-01	FINGER GUARD	
310	1	754-01	SWITCH TOGGLE	
330	1	267-01	FUSE 3AMP 3AG SLO-BLO	
340	1	274-00	FUSEHOLDER	
420	1	972-02	CHASSIS SLIDE	
435	2	280-05	HANDLE CABINET	
440	4	261-02	FERRULE HANDLE	
470	A/R	993-01	WIRE 18 AWG WHITE	
480	A/R	992-10	WIRE 22 AWG WHITE	
490	A/R	989-00	WIRE 22 AWG	
500	A/R	949-00	TUBING	
510	A/R	993-20	CABLE RG174/U	
520	A/R	994-05	WIRE 22 AWG BLACK/WHITE	
528	76	659-00	SCREW PHMS 2-56 X 5/16	
540	94	668-00	SCREW PHMS 4-40 X 1/2	
550	32	666-00	SCREW PHMS 4-40 X 3/8	
560	6	665-00	SCREW PHMS 4-40 X 5/16	
565	8	624-00	SCREW FILL 4-40 X 3/8	

TITLE: MULTIPLEX EXPANSION MODULE
DWG NO. 58845-00 REV ..D...
SHEET..2 OF.2.

PRESTON SCIENTIFIC INC.
PRINTED 12/01/76

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
570	36	641-00	SCREW FHMS 6-32 X 3/8	
580	2	675-00	SCREW PHMS 6-32 X 3/8	
590	8	679-00	SCREW PHMS 6-32 X 3/4	
600	4	724-00	SCREW HEX HD 10-32 X 3/8	
610	4	700-00	SCREW HEX 10-32 X 5/8	
620	94	874-00	WASHER LOCK #4	
630	1	863-00	WASHER E.T. #6	
640	4	877-00	WASHER LOCK #10	
650	8	869-00	WASHER FLAT #6 STD	
660	140	855-00	WASHER FLAT #4 SM	
670	33	854-00	WASHER FLAT #6 SM	
680	8	872-00	WASHER FLAT #10	
700	94	318-01	NUT 4-40	
710	46	296-00	NUT LOCK 4-40	
720	34	297-00	NUT LOCK 6-32	
730	4	299-00	NUT LOCK 10-32	
735	4	794-00	LUG CRIMP	
740	50	261-14	FERRULE TERMASHIELD	
750	100	262-00	FERRULE	
770	1	46020-00	SHIELD COMPONENT SIDE	C
775	18	52184-00	SHIELD COMPONENT SIDE	C
780	2	46021-00	SHIELD CIRCUIT SIDE	B
800	94	40341-00	GUIDE CARD	D
810	3	558-04	RESISTOR 1/2W 5% 1	
820	3	120-00	CAPACITOR 20% .47UF	

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL

BY	DATE
DWN D.T. SYMONS	5-23-74
CHK	6-21-74
ENG	6-21-74
APP	

TITLE CUSTOMER CONNECTION & INTERFACE GMD MULTIPLEXER

MAT'L

FINISH

58845

NEXT ASSY

A SIZE

58846

SCALE

SH 1 OF 12

PRESTON SCIENTIFIC INCORPORATED
803 East Cerritos Ave., Anaheim, Calif. 92803
Tel (714) 776-6400

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
0010		CUSTOMER CONNECTION & INTERFACE		
0020		GMD MULTIPLEXER		
0030		76 CHANNELS GMD MULTIPLEXER,		
0060		+ OR - 10.24 VOLTS FULL SCALE		
0100	2	CONNECTOR J1 ANALOG INPUTS 20 TO 53		
0120		WINCHESTER TYPE MRAC 104S-J6		
0140	1	MUX 20 HI	J1 A MUX INPUT CHANNEL 20 HIGH	
0150		MUX 20 LO	J1 K MUX INPUT CHANNEL 20 LOW	
0160		MUX 20 SH	J1 U MUX INPUT CHANNEL 20 SHIELD	
0170		MUX 21 HI	J1 E MUX INPUT CHANNEL 21 HIGH	
0180		MUX 21 LO	J1 P MUX INPUT CHANNEL 21 LOW	
0190		MUX 21 SH	J1 Y MUX INPUT CHANNEL 21 SHIELD	
0200		MUX 22 HI	J1 B MUX INPUT CHANNEL 22 HIGH	
0210		MUX 22 LO	J1 L MUX INPUT CHANNEL 22 LOW	
0220		MUX 22 SH	J1 V MUX INPUT CHANNEL 22 SHIELD	
0230		MUX 23 HI	J1 F MUX INPUT CHANNEL 23 HIGH	
0240		MUX 23 LO	J1 R MUX INPUT CHANNEL 23 LOW	
0250		MUX 23 SH	J1 Z MUX INPUT CHANNEL 23 SHIELD	
0260		MUX 24 HI	J1 C MUX INPUT CHANNEL 24 HIGH	
0270		MUX 24 LO	J1 M MUX INPUT CHANNEL 24 LOW	
0280		MUX 24 SH	J1 W MUX INPUT CHANNEL 24 SHIELD	
0290		MUX 25 HI	J1 H MUX INPUT CHANNEL 25 HIGH	
0300		MUX 25 LO	J1 S MUX INPUT CHANNEL 25 LOW	
0310		MUX 25 SH	J1 -A MUX INPUT CHANNEL 25 SHIELD	
0320		MUX 26 HI	J1 D MUX INPUT CHANNEL 26 HIGH	
0330		MUX 26 LO	J1 N MUX INPUT CHANNEL 26 LOW	
0340		MUX 26 SH	J1 X MUX INPUT CHANNEL 26 SHIELD	
0350		MUX 27 HI	J1 J MUX INPUT CHANNEL 27 HIGH	
0360		MUX 27 LO	J1 T MUX INPUT CHANNEL 27 LOW	
0370		MUX 27 SH	J1 -B MUX INPUT CHANNEL 27 SHIELD	
0380		MUX 28 HI	J1 -C MUX INPUT CHANNEL 28 HIGH	
0390		MUX 28 LO	J1 -M MUX INPUT CHANNEL 28 LOW	
0400		MUX 28 SH	J1 -V MUX INPUT CHANNEL 28 SHIELD	
0410		MUX 29 HI	J1 -H MUX INPUT CHANNEL 29 HIGH	
0420		MUX 29 LO	J1 -R MUX INPUT CHANNEL 29 LOW	
0430		MUX 29 SH	J1 -Z MUX INPUT CHANNEL 29 SHIELD	
0440		MUX 30 HI	J1 -D MUX INPUT CHANNEL 30 HIGH	
0450		MUX 30 LO	J1 -N MUX INPUT CHANNEL 30 LOW	
0460		MUX 30 SH	J1 -W MUX INPUT CHANNEL 30 SHIELD	
0470		MUX 31 HI	J1 -I MUX INPUT CHANNEL 31 HIGH	
0480		MUX 31 LO	J1 -S MUX INPUT CHANNEL 31 LOW	
0490		MUX 31 SH	J1 AA MUX INPUT CHANNEL 31 SHIELD	

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
0500	P	MUX 32 HI	J1 -F MUX INPUT CHANNEL 32 HIGH	
0510		MUX 32 LO	J1 -P MUX INPUT CHANNEL 32 LOW	
0520		MUX 32 SH	J1 -X MUX INPUT CHANNEL 32 SHIELD	
0530		MUX 33 HI	J1 -J MUX INPUT CHANNEL 33 HIGH	
0540		MUX 33 LO	J1 -T MUX INPUT CHANNEL 33 LOW	
0550		MUX 33 SH	J1 AB MUX INPUT CHANNEL 33 SHIELD	
0560		MUX 34 HI	J1 -G MUX INPUT CHANNEL 34 HIGH	
0570		MUX 34 LO	J1 -Q MUX INPUT CHANNEL 34 LOW	
0580		MUX 34 SH	J1 -Y MUX INPUT CHANNEL 34 SHIELD	
0590		MUX 35 HI	J1 -K MUX INPUT CHANNEL 35 HIGH	
0600		MUX 35 LO	J1 -U MUX INPUT CHANNEL 35 LOW	
0610		MUX 35 SH	J1 AC MUX INPUT CHANNEL 35 SHIELD	
0620		MUX 36 HI	J1 AD MUX INPUT CHANNEL 36 HIGH	
0630		MUX 36 LO	J1 AN MUX INPUT CHANNEL 36 LOW	
0640		MUX 36 SH	J1 AX MUX INPUT CHANNEL 36 SHIELD	
0650		MUX 37 HI	J1 AJ MUX INPUT CHANNEL 37 HIGH	
0660		MUX 37 LO	J1 AT MUX INPUT CHANNEL 37 LOW	
0670		MUX 37 SH	J1 BB MUX INPUT CHANNEL 37 SHIELD	
0680		MUX 38 HI	J1 AE MUX INPUT CHANNEL 38 HIGH	
0690		MUX 38 LO	J1 AP MUX INPUT CHANNEL 38 LOW	
0700		MUX 38 SH	J1 AY MUX INPUT CHANNEL 38 SHIELD	
0710		MUX 39 HI	J1 AK MUX INPUT CHANNEL 39 HIGH	
0720		MUX 39 LO	J1 AU MUX INPUT CHANNEL 39 LOW	
0730		MUX 39 SH	J1 BC MUX INPUT CHANNEL 39 SHIELD	
0740		MUX 40 HI	J1 AF MUX INPUT CHANNEL 40 HIGH	
0750		MUX 40 LO	J1 AR MUX INPUT CHANNEL 40 LOW	
0760		MUX 40 SH	J1 AZ MUX INPUT CHANNEL 40 SHIELD	
0770		MUX 41 HI	J1 AL MUX INPUT CHANNEL 41 HIGH	
0780		MUX 41 LO	J1 AV MUX INPUT CHANNEL 41 LOW	
0790		MUX 41 SH	J1 BD MUX INPUT CHANNEL 41 SHIELD	
0800		MUX 42 HI	J1 AH MUX INPUT CHANNEL 42 HIGH	
0810		MUX 42 LO	J1 AS MUX INPUT CHANNEL 42 LOW	
0820		MUX 42 SH	J1 BA MUX INPUT CHANNEL 42 SHIELD	
0830		MUX 43 HI	J1 AM MUX INPUT CHANNEL 43 HIGH	
0840		MUX 43 LO	J1 AW MUX INPUT CHANNEL 43 LOW	
0850		MUX 43 SH	J1 BE MUX INPUT CHANNEL 43 SHIELD	
0860		MUX 44 HI	J1 BF MUX INPUT CHANNEL 44 HIGH	
0870		MUX 44 LO	J1 BR MUX INPUT CHANNEL 44 LOW	
0880		MUX 44 SH	J1 BZ MUX INPUT CHANNEL 44 SHIELD	
0890		MUX 45 HI	J1 BL MUX INPUT CHANNEL 45 HIGH	
0900		MUX 45 LO	J1 BV MUX INPUT CHANNEL 45 LOW	
0910		MUX 45 SH	J1 CD MUX INPUT CHANNEL 45 SHIELD	
0920		MUX 46 HI	J1 BH MUX INPUT CHANNEL 46 HIGH	
0930		MUX 46 LO	J1 BS MUX INPUT CHANNEL 46 LOW	
0940		MUX 46 SH	J1 CA MUX INPUT CHANNEL 46 SHIELD	
0950		MUX 47 HI	J1 BM MUX INPUT CHANNEL 47 HIGH	
0960		MUX 47 LO	J1 BW MUX INPUT CHANNEL 47 LOW	
0970		MUX 47 SH	J1 CE MUX INPUT CHANNEL 47 SHIELD	

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
0980	P	MUX 48 HI	J1 BJ MUX INPUT CHANNEL 48 HIGH	
0990		MUX 48 LO	J1 BT MUX INPUT CHANNEL 48 LOW	
1000		MUX 48 SH	J1 CB MUX INPUT CHANNEL 48 SHIELD	
1010		MUX 49 HI	J1 BN MUX INPUT CHANNEL 49 HIGH	
1020		MUX 49 LO	J1 BX MUX INPUT CHANNEL 49 HIGH	
1030		MUX 49 SH	J1 CF MUX INPUT CHANNEL 49 SHIELD	
1040		MUX 50 HI	J1 BK MUX INPUT CHANNEL 50 HIGH	
1050		MUX 50 LO	J1 BU MUX INPUT CHANNEL 50 LOW	
1060		MUX 50 SH	J1 CC MUX INPUT CHANNEL 50 SHIELD	
1070		MUX 51 HI	J1 BP MUX INPUT CHANNEL 51 HIGH	
1080		MUX 51 LO	J1 BY MUX INPUT CHANNEL 51 LOW	
1090		MUX 51 SH	J1 CH MUX INPUT CHANNEL 51 SHIELD	
1100		MUX 52 HI	J1 CJ MUX INPUT CHANNEL 52 HIGH	
1110		MUX 52 LO	J1 CN MUX INPUT CHANNEL 52 LOW	
1120		MUX 52 SH	J1 CK MUX INPUT CHANNEL 52 SHIELD	
1130		MUX 53 HI	J1 CP MUX INPUT CHANNEL 53 HIGH	
1140		MUX 53 LO	J1 CL MUX INPUT CHANNEL 53 LOW	
1150		MUX 53 SH	J1 CR MUX INPUT CHANNEL 53 SHIELD	
1160		ANALOG GRD	J1 CM ANALOG GROUND	
1170		ANALOG GRD	J1 CS ANALOG GROUND	

	SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
P	CONNECTOR J2 ANALOG INPUTS 54 TO 55		
	64 TO 95		
	WINCHESTER TYPE MRAC 104S-J6		
1	MUX 54 HI	J2 A MUX INPUT CHANNEL 54 HI	
	MUX 54 LO	J2 K MUX INPUT CHANNEL 54 LOW	
	MUX 54 SH	J2 U MUX INPUT CHANNEL 54 SHIELD	
	MUX 55 HI	J2 E MUX INPUT CHANNEL 55 HIGH	
	MUX 55 LO	J2 P MUX INPUT CHANNEL 55 LOW	
	MUX 55 SH	J2 Y MUX INPUT CHANNEL 55 SHIELD	
	MUX 64 HI	J2 B MUX INPUT CHANNEL 64 HIGH	
	MUX 64 LO	J2 L MUX INPUT CHANNEL 64 LOW	
	MUX 64 SH	J2 V MUX INPUT CHANNEL 64 SHIELD	
	MUX 65 HI	J2 F MUX INPUT CHANNEL 65 HIGH	
	MUX 65 LO	J2 R MUX INPUT CHANNEL 65 LOW	
	MUX 65 SH	J2 Z MUX INPUT CHANNEL 65 SHIELD	
	MUX 66 HI	J2 C MUX INPUT CHANNEL 66 HIGH	
	MUX 66 LO	J2 M MUX INPUT CHANNEL 66 LOW	
	MUX 66 SH	J2 W MUX INPUT CHANNEL 66 SHIELD	
	MUX 67 HI	J2 H MUX INPUT CHANNEL 67 HIGH	
	MUX 67 LO	J2 S MUX INPUT CHANNEL 67 LOW	
	MUX 67 SH	J2 -A MUX INPUT CHANNEL 67 SHIELD	
	MUX 68 HI	J2 D MUX INPUT CHANNEL 68 HIGH	
	MUX 68 LO	J2 N MUX INPUT CHANNEL 68 LOW	
	MUX 68 SH	J2 X MUX INPUT CHANNEL 68 SHIELD	
	MUX 69 HI	J2 J MUX INPUT CHANNEL 69 HIGH	
	MUX 69 LO	J2 T MUX INPUT CHANNEL 69 LOW	
	MUX 69 SH	J2 -B MUX INPUT CHANNEL 69 SHIELD	
	MUX 70 HI	J2 -C MUX INPUT CHANNEL 70 HIGH	
	MUX 70 LO	J2 -M MUX INPUT CHANNEL 70 LOW	
	MUX 70 SH	J2 -V MUX INPUT CHANNEL 70 SHIELD	
	MUX 71 HI	J2 -H MUX INPUT CHANNEL 71 HIGH	
	MUX 71 LO	J2 -R MUX INPUT CHANNEL 71 LOW	
	MUX 71 SH	J2 -Z MUX INPUT CHANNEL 71 SHIELD	
	MUX 72 HI	J2 -D MUX INPUT CHANNEL 72 HIGH	
	MUX 72 LO	J2 -N MUX INPUT CHANNEL 72 LOW	
	MUX 72 SH	J2 -W MUX INPUT CHANNEL 72 SHIELD	
	MUX 73 HI	J2 -I MUX INPUT CHANNEL 73 HIGH	
	MUX 73 LO	J2 -S MUX INPUT CHANNEL 73 LOW	
	MUX 73 SH	J2 AA MUX INPUT CHANNEL 73 SHIELD	
	MUX 74 HI	J2 -F MUX INPUT CHANNEL 74 HIGH	
	MUX 74 LO	J2 -P MUX INPUT CHANNEL 74 LOW	
	MUX 74 SH	J2 -X MUX INPUT CHANNEL 74 SHIELD	
	MUX 75 HI	J2 -J MUX INPUT CHANNEL 75 HIGH	
	MUX 75 LO	J2 -T MUX INPUT CHANNEL 75 LOW	
	MUX 75 SH	J2 AB MUX INPUT CHANNEL 75 SHIELD	
	MUX 76 HI	J2 -G MUX INPUT CHANNEL 76 HIGH	
	MUX 76 LO	J2 -Q MUX INPUT CHANNEL 76 LOW	
	MUX 76 SH	J2 -Y MUX INPUT CHANNEL 76 SHIELD	

	SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
P	MUX 77 HI	J2 -K MUX INPUT CHANNEL 77 HIGH	
	MUX 77 LO	J2 -U MUX INPUT CHANNEL 77 LOW	
	MUX 77 SH	J2 AC MUX INPUT CHANNEL 77 SHIELD	
	MUX 78 HI	J2 AD MUX INPUT CHANNEL 78 HIGH	
	MUX 78 LO	J2 AN MUX INPUT CHANNEL 78 LOW	
	MUX 78 SH	J2 AX MUX INPUT CHANNEL 78 SHIELD	
	MUX 79 HI	J2 AJ MUX INPUT CHANNEL 79 HIGH	
	MUX 79 LO	J2 AT MUX INPUT CHANNEL 79 LOW	
	MUX 79 SH	J2 BB MUX INPUT CHANNEL 79 SHIELD	
	MUX 80 HI	J2 AE MUX INPUT CHANNEL 80 HIGH	
	MUX 80 LO	J2 AP MUX INPUT CHANNEL 80 LOW	
	MUX 80 SH	J2 AY MUX INPUT CHANNEL 80 SHIELD	
	MUX 81 HI	J2 AK MUX INPUT CHANNEL 81 HIGH	
	MUX 81 LO	J2 AU MUX INPUT CHANNEL 81 LOW	
	MUX 81 SH	J2 BC MUX INPUT CHANNEL 81 SHIELD	
	MUX 82 HI	J2 AF MUX INPUT CHANNEL 82 HIGH	
	MUX 82 LO	J2 AR MUX INPUT CHANNEL 82 LOW	
	MUX 82 SH	J2 AZ MUX INPUT CHANNEL 82 SHIELD	
	MUX 83 HI	J2 AL MUX INPUT CHANNEL 83 HIGH	
	MUX 83 LO	J2 AY MUX INPUT CHANNEL 83 LOW	
	MUX 83 SH	J2 BD MUX INPUT CHANNEL 83 SHIELD	
	MUX 84 HI	J2 AH MUX INPUT CHANNEL 84 HIGH	
	MUX 84 LO	J2 AS MUX INPUT CHANNEL 84 LOW	
	MUX 84 SH	J2 BA MUX INPUT CHANNEL 84 SHIELD	
	MUX 85 HI	J2 AM MUX INPUT CHANNEL 85 HIGH	
	MUX 85 LO	J2 AW MUX INPUT CHANNEL 85 LOW	
	MUX 85 SH	J2 BE MUX INPUT CHANNEL 85 SHIELD	
	MUX 86 HI	J2 BF MUX INPUT CHANNEL 86 HIGH	
	MUX 86 LO	J2 BR MUX INPUT CHANNEL 86 LOW	
	MUX 86 SH	J2 BZ MUX INPUT CHANNEL 86 SHIELD	
	MUX 87 HI	J2 BL MUX INPUT CHANNEL 87 HIGH	
	MUX 87 LO	J2 BV MUX INPUT CHANNEL 87 LOW	
	MUX 87 SH	J2 CD MUX INPUT CHANNEL 87 SHIELD	
	MUX 88 HI	J2 BH MUX INPUT CHANNEL 88 HIGH	
	MUX 88 LO	J2 BS MUX INPUT CHANNEL 88 LOW	
	MUX 88 SH	J2 CA MUX INPUT CHANNEL 88 SHIELD	
	MUX 89 HI	J2 BM MUX INPUT CHANNEL 89 HIGH	
	MUX 89 LO	J2 BW MUX INPUT CHANNEL 89 LOW	
	MUX 89 SH	J2 CE MUX INPUT CHANNEL 89 SHIELD	
	MUX 90 HI	J2 BJ MUX INPUT CHANNEL 90 HIGH	
	MUX 90 LO	J2 BT MUX INPUT CHANNEL 90 LOW	
	MUX 90 SH	J2 CB MUX INPUT CHANNEL 90 SHIELD	
	MUX 91 HI	J2 BN MUX INPUT CHANNEL 91 HIGH	
	MUX 91 LO	J2 BX MUX INPUT CHANNEL 91 LOW	
	MUX 91 SH	J2 CF MUX INPUT CHANNEL 91 SHIELD	
	MUX 92 HI	J2 BK MUX INPUT CHANNEL 92 HIGH	
	MUX 92 LO	J2 BU MUX INPUT CHANNEL 92 LOW	
	MUX 92 SH	J2 CC MUX INPUT CHANNEL 92 SHIELD	

	SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
P	MUX 93 HI	J2 BP MUX INPUT CHANNEL 93 HIGH	
	MUX 93 LO	J2 BY MUX INPUT CHANNEL 93 LOW	
	MUX 93 SH	J2 CH MUX INPUT CHANNEL 93 SHIELD	
	MUX 94 HI	J2 CJ MUX INPUT CHANNEL 94 HIGH	
	MUX 94 LO	J2 CN MUX INPUT CHANNEL 94 LOW	
	MUX 94 SH	J2 CK MUX INPUT CHANNEL 94 SHIELD	
	MUX 95 HI	J2 CP MUX INPUT CHANNEL 95 HIGH	
	MUX 95 LO	J2 CL MUX INPUT CHANNEL 95 LOW	
	MUX 95 SH	J2 CR MUX INPUT CHANNEL 95 SHIELD	
	ANALOG GRD	J2 CH ANALOG GROUND	
	ANALOG GRD	J2 CS ANALOG GROUND	

	SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
P	CONNECTOR J3 ANALOG INPUTS 96 TO 103		
	WINCHESTER TYPE MRAC 34S-J6		
1	MUX 96 HI	J3 A MUX INPUT CHANNEL 96 HIGH	
	MUX 96 LO	J3 E MUX INPUT CHANNEL 96 LOW	
	MUX 96 SH	J3 K MUX INPUT CHANNEL 96 SHIELD	
	MUX 97 HI	J3 B MUX INPUT CHANNEL 97 HIGH	
	MUX 97 LO	J3 F MUX INPUT CHANNEL 97 LOW	
	MUX 97 SH	J3 L MUX INPUT CHANNEL 97 SHIELD	
	MUX 98 HI	J3 C MUX INPUT CHANNEL 98 HIGH	
	MUX 98 LO	J3 H MUX INPUT CHANNEL 98 LOW	
	MUX 98 SH	J3 M MUX INPUT CHANNEL 98 SHIELD	
	MUX 99 HI	J3 D MUX INPUT CHANNEL 99 HIGH	
	MUX 99 LO	J3 J MUX INPUT CHANNEL 99 LOW	
	MUX 99 SH	J3 N MUX INPUT CHANNEL 99 SHIELD	
	MUX100 HI	J3 P MUX INPUT CHANNEL 100 HIGH	
	MUX100 LO	J3 U MUX INPUT CHANNEL 100 LOW	
	MUX100 SH	J3 Y MUX INPUT CHANNEL 100 SHIELD	
	MUX101 HI	J3 T MUX INPUT CHANNEL 101 HIGH	
	MUX101 LO	J3 X MUX INPUT CHANNEL 101 LOW	
	MUX101 SH	J3 -B MUX INPUT CHANNEL 101 SHIELD	
	MUX102 HI	J3 R MUX INPUT CHANNEL 102 HIGH	
	MUX102 LO	J3 V MUX INPUT CHANNEL 102 LOW	
	MUX102 SH	J3 Z MUX INPUT CHANNEL 102 SHIELD	
	MUX103 HI	J3 S MUX INPUT CHANNEL 103 HIGH	
	MUX103 LO	J3 W MUX INPUT CHANNEL 103 LOW	
	MUX103 SH	J3 -A MUX INPUT CHANNEL 103 SHIELD	
	BLANK	J3 -C NO CONNECTION	
	BLANK	J3 -H NO CONNECTION	
	BLANK	J3 -M NO CONNECTION	
	BLANK	J3 -D NO CONNECTION	
	BLANK	J3 -I NO CONNECTION	
	BLANK	J3 -N NO CONNECTION	
	BLANK	J3 -G NO CONNECTION	
	BLANK	J3 -K NO CONNECTION	
	ANALOG GRD	J3 -F ANALOG GROUND	
	ANALOG GRD	J3 -J ANALOG GROUND	

	SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
P	CONNECTOR J4 DIGITAL ADDRESS & CONTROLS FROM ADC WINCHESTER TYPE MRAC 50S-J6		
1	MUXAD01* J4 A	MULTIPLEXER ADDRESS 01*	
	MUXAD01* SH J4 B	MULTIPLEXER ADDRESS 01*	SHIELD
	MUXAD02* J4 C	MULTIPLEXER ADDRESS 02*	
	MUXAD02* SH J4 D	MULTIPLEXER ADDRESS 02*	SHIELD
	MUXAD04* J4 E	MULTIPLEXER ADDRESS 04*	
	MUXAD04* SH J4 F	MULTIPLEXER ADDRESS 04*	SHIELD
	FIELD02* J4 H	FIELD 02*	
	FIELD02* SH J4 J	FIELD 02*	SHIELD
	FIELD03* J4 K	FIELD 03*	
	FIELD03* SH J4 L	FIELD 03*	SHIELD
	FIELD04* J4 M	FIELD 04*	
	FIELD04* SH J4 N	FIELD 04*	SHIELD
	FIELD05* J4 P	FIELD 05*	
	FIELD05* SH J4 R	FIELD 05*	SHIELD
	FIELD06* J4 S	FIELD 06*	
	FIELD06* SH J4 T	FIELD 06*	SHIELD
	FIELD07* J4 U	FIELD 07*	
	FIELD07* SH J4 V	FIELD 07*	SHIELD
	FIELD08* J4 W	FIELD 08*	
	FIELD08* SH J4 X	FIELD 08*	SHIELD
	FIELD09* J4 Y	FIELD 09*	
	FIELD09* SH J4 Z	FIELD 09*	SHIELD
	FIELD10* J4 -A	FIELD 10*	
	FIELD10* SH J4 -B	FIELD 10*	SHIELD
	FIELD11* J4 -C	FIELD 11*	
	FIELD11* SH J4 -D	FIELD 11*	SHIELD
	FIELD12* J4 -E	FIELD 12*	
	FIELD12* SH J4 -F	FIELD 12*	SHIELD
	FIELD13* J4 -H	FIELD 13*	
	FIELD13* SH J4 -J	FIELD 13*	SHIELD
	FIELD14* J4 -K	FIELD 14*	
	FIELD14* SH J4 -M	FIELD 14*	SHIELD
	FIELD15* J4 -N	FIELD 15*	
	FIELD15* SH J4 -P	FIELD 15*	SHIELD

	SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
P	BLANK J4 -R	NO CONNECTION	
	BLANK J4 -S	NO CONNECTION	
	BLANK J4 -T	NO CONNECTION	
	BLANK J4 -U	NO CONNECTION	
	BLANK J4 -V	NO CONNECTION	
	BLANK J4 -W	NO CONNECTION	
	BLANK J4 -X	NO CONNECTION	
	BLANK J4 -Y	NO CONNECTION	
	BLANK J4 -Z	NO CONNECTION	
	BLANK J4 AA	NO CONNECTION	
	BLANK J4 BB	NO CONNECTION	
	BLANK J4 CC	NO CONNECTION	
	BLANK J4 DD	NO CONNECTION	
	BLANK J4 EE	NO CONNECTION	
	LOGIC GRD J4 FF	LOGIC GROUND	
	LOGIC GRD J4 HH	LOGIC GROUND	

	SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
P	CONNECTOR J5 ANALOG TO ADC MODULE MS3102A-14S-5S		
1	ANALOG OUT J5 A	ANALOG OUTPUT	
	GUARD J5 B	GUARD	
	BLANK J5 C	NO CONNECTION	
	ANALOG GRD J5 D	ANALOG GROUND	
	ANALOG GRD J5 E	ANALOG GROUND	
2	CONNECTOR J6 ANALOG OUTPUT MS3102A-14S-5S		
1	ANALOG OUT J6 A	ANALOG OUTPUT	
	GUARD J6 B	GUARD	
	BLANK J6 C	NO CONNECTION	
	ANALOG GRD J6 D	ANALOG GROUND	
	ANALOG GRD J6 E	ANALOG GROUND	
2	CONNECTOR J7 ANALOG OUTPUT MS3102A-14S-5S		
1	ANALOG OUT J7 A	ANALOG OUTPUT	
	GUARD J7 B	GUARD	
	BLANK J7 C	NO CONNECTION	
	ANALOG GRD J7 D	ANALOG GROUND	
	ANALOG GRD J7 E	ANALOG GROUND	

	SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
P	CONNECTOR J8 ANALOG OUT CONTINUOUS MRAC 18S-J6		
1	ANAOT 20 J8 A	ANALOG OUT CHANNEL 20	
	ANAOT 20 SH J8 B	ANALOG OUT CHANNEL 20	SHIELD
	ANAOT 21 J8 C	ANALOG OUT CHANNEL 21	
	ANAOT 21 SH J8 D	ANALOG OUT CHANNEL 21	SHIELD
	ANAOT 32 J8 E	ANALOG OUT CHANNEL 32	
	ANAOT 32 SH J8 F	ANALOG OUT CHANNEL 32	SHIELD
	ANAOT 33 J8 H	ANALOG OUT CHANNEL 33	
	ANAOT 33 SH J8 J	ANALOG OUT CHANNEL 33	SHIELD
	ANAOT 40 J8 K	ANALOG OUT CHANNEL 40	
	ANAOT 40 SH J8 L	ANALOG OUT CHANNEL 40	SHIELD
	ANAOT 41 J8 M	ANALOG OUT CHANNEL 41	
	ANAOT 41 SH J8 N	ANALOG OUT CHANNEL 41	SHIELD
	ANAOT 52 J8 P	ANALOG OUT CHANNEL 52	
	ANAOT 52 SH J8 R	ANALOG OUT CHANNEL 52	SHIELD
	ANAOT 53 J8 S	ANALOG OUT CHANNEL 53	
	ANAOT 53 SH J8 T	ANALOG OUT CHANNEL 53	SHIELD
	ANALOG GRD J8 U	ANALOG GROUND	
	ANALOG GRD J8 V	ANALOG GROUND	

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	E.O. 5420	8-25-74	
B	E.O. 5513	6-17-75	

BY	DATE
DWN B. HEIDEMAN	7-26-74
CHK	7-26-74
ENG	7-30-74
APP	

TITLE WIRE LIST, GMD MULTIPLEXER
76 CHANNELS MULTIPLEXER
±10.24 VOLTS FULL SCALE

MAT'L

FINISH

58845

NEXT ASSY

A
SIZE

58847

SCALE

SH 1 OF 18

PRESTON
SCIENTIFIC INCORPORATED
803 East Cerritos Ave Anaheim Calif 92805
Tel (714) 776-6400

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
0010				WIRE LIST, GMD MULTIPLEXER
0020				76 CHANNELS MULTIPLEXER
0030				+ OR - 10.24 VOLTS FULL SCALE
0040	2			NOTE UNLESS OTHERWISE SPECIFIED
0050				ALL WIRE IS TO BE 22 AWG WHITE.
0060	2			NOTE 01. 18 AWG
0070				NOTE 02. RG 174 /U
0080				NOTE 03. TWO (2) CONDUCTOR SHIELDED
0090				NOTE 04. FOR AC PWR WIRING SEE
0100				DRAWING 58936.
0101				NOTE 05. 22 AWG BUSS WIRE,TEGLON SLEEVING
0110	2			CONNECT TWO (2) 18 AWG WIRES FROM GROUND
0120				POST ON REAR CONNECTOR PLATE TO B10-19

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
0130	P			CONNECTOR J1 ANALOG IMPUTS 20 TO 53
0140				MRAC 104S-J6
0150	1	MUX 20 HI	J1 A	MUX 20 HI A01 37 NOTE 3 BLK
0160		MUX 20 LO	J1 K	MUX 20 LO A01 36 NOTE 3 WHT
0170		MUX 20 SH	J1 U	MUX 20 SH A01 35 NOTE 3 SHLD
0180		MUX 21 HI	J1 E	MUX 21 HI A01 02 NOTE 3 BLK
0190		MUX 21 LO	J1 P	MUX 21 LO A01 03 NOTE 3 WHT
0200		MUX 21 SH	J1 Y	MUX 21 SH A01 01 NOTE 3 SHLD
0210		MUX 22 HI	J1 B	MUX 22 HI A02 37 NOTE 3 BLK
0220		MUX 22 LO	J1 L	MUX 22 LO A02 36 NOTE 3 WHT
0230		MUX 22 SH	J1 V	MUX 22 SH A02 35 NOTE 3 SHLD
0240		MUX 23 HI	J1 F	MUX 23 HI A02 02 NOTE 3 BLK
0250		MUX 23 LO	J1 R	MUX 23 LO A02 03 NOTE 3 WHT
0260		MUX 23 SH	J1 Z	MUX 23 SH A02 01 NOTE 3 SHLD
0270		MUX 24 HI	J1 C	MUX 24 HI A03 37 NOTE 3 BLK
0280		MUX 24 LO	J1 M	MUX 24 LO A03 36 NOTE 3 WHT
0290		MUX 24 SH	J1 W	MUX 24 SH A03 35 NOTE 3 SHLD
0300		MUX 25 HI	J1 H	MUX 25 HI A03 02 NOTE 3 BLK
0310		MUX 25 LO	J1 S	MUX 25 LO A03 03 NOTE 3 WHT
0320		MUX 25 SH	J1 -A	MUX 25 SH A03 01 NOTE 3 SHLD
0330		MUX 26 HI	J1 D	MUX 26 HI A04 37 NOTE 3 BLK
0340		MUX 26 LO	J1 N	MUX 26 LO A04 36 NOTE 3 WHT
0350		MUX 26 SH	J1 X	MUX 26 SH A04 35 NOTE 3 SHLD
0360		MUX 27 HI	J1 J	MUX 27 HI A04 02 NOTE 3 BLK
0370		MUX 27 LO	J1 T	MUX 27 LO A04 03 NOTE 3 WHT
0380		MUX 27 SH	J1 -B	MUX 27 SH A04 01 NOTE 3 SHLD
0390		MUX 28 HI	J1 -C	MUX 28 HI A05 37 NOTE 3 BLK
0400		MUX 28 LO	J1 -M	MUX 28 LO A05 36 NOTE 3 WHT
0410		MUX 28 SH	J1 -V	MUX 28 SH A05 35 NOTE 3 SHLD
0420		MUX 29 HI	J1 -H	MUX 29 HI A05 02 NOTE 3 BLK
0430		MUX 29 LO	J1 -R	MUX 29 LO A05 03 NOTE 3 WHT
0440		MUX 29 SH	J1 -Z	MUX 29 SH A05 01 NOTE 3 SHLD
0450		MUX 30 HI	J1 -D	MUX 30 HI A06 37 NOTE 3 BLK
0460		MUX 30 LO	J1 -N	MUX 30 LO A06 36 NOTE 3 WHT
0470		MUX 30 SH	J1 -W	MUX 30 SH A06 35 NOTE 3 SHLD
0480		MUX 31 HI	J1 -I	MUX 31 HI A06 02 NOTE 3 BLK
0490		MUX 31 LO	J1 -S	MUX 31 LO A06 03 NOTE 3 WHT
0500		MUX 31 SH	J1 AA	MUX 31 SH A06 01 NOTE 3 SHLD
0510		MUX 32 HI	J1 -F	MUX 32 HI A07 37 NOTE 3 BLK
0520		MUX 32 LO	J1 -P	MUX 32 LO A07 36 NOTE 3 WHT
0530		MUX 32 SH	J1 -X	MUX 32 SH A07 35 NOTE 3 SHLD
0540		MUX 33 HI	J1 -J	MUX 33 HI A07 02 NOTE 3 BLK
0550		MUX 33 LO	J1 -T	MUX 33 LO A07 03 NOTE 3 WHT
0560		MUX 33 SH	J1 AB	MUX 33 SH A07 01 NOTE 3 SHLD
0570		MUX 34 HI	J1 -G	MUX 34 HI A08 37 NOTE 3 BLK
0580		MUX 34 LO	J1 -Q	MUX 34 LO A08 36 NOTE 3 WHT
0590		MUX 34 SH	J1 -Y	MUX 34 SH A08 35 NOTE 3 SHLD
0600		MUX 35 HI	J1 -K	MUX 32 HI A08 02 NOTE 3 BLK
0610		MUX 35 LO	J1 -U	MUX 35 LO A08 03 NOTE 3 WHT

	SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
0620	MUX 35 SH	J1 AC	MUX 35 SH A08 01 NOTE 3 SHLD
0630	MUX 36 HI	J1 AD	MUX 36 HI A09 37 NOTE 3 BLK
0640	MUX 36 LO	J1 AN	MUX 36 LO A09 36 NOTE 3 WHT
0650	MUX 36 SH	J1 AX	MUX 36 SH A09 35 NOTE 3 SHLD
0660	MUX 37 HI	J1 AJ	MUX 37 HI A09 02 NOTE 3 BLK
0670	MUX 37 LO	J1 AT	MUX 37 LO A09 03 NOTE 3 WHT
0680	MUX 37 SH	J1 BB	MUX 37 SH A09 01 NOTE 3 SHLD
0690	MUX 38 HI	J1 AE	MUX 38 HI A10 37 NOTE 3 BLK
0700	MUX 38 LO	J1 AP	MUX 38 LO A10 36 NOTE 3 WHT
0710	MUX 38 SH	J1 QY	MUX 38 SH A10 35 NOTE 3 SHLD
0720	MUX 39 HI	J1 AK	MUX 39 HI A10 02 NOTE 3 BLK
0730	MUX 39 LO	J1 AU	MUX 39 LO A10 03 NOTE 3 WHT
0740	MUX 39 SH	J1 BC	MUX 39 SH A10 01 NOTE 3 SHLD
0750	MUX 40 HI	J1 AF	MUX 40 HI A11 37 NOTE 3 BLK
0760	MUX 40 LO	J1 AR	MUX 40 LO A11 36 NOTE 3 WHT
0770	MUX 40 SH	J1 AZ	MUX 40 SH A11 35 NOTE 3 SHLD
0780	MUX 41 HI	J1 AL	MUX 41 HI A11 02 NOTE 3 BLK
0790	MUX 41 LO	J1 AV	MUX 41 LO A11 03 NOTE 3 WHT
0800	MUX 41 SH	J1 BD	MUX 41 SH A11 01 NOTE 3 SHLD
0810	MUX 42 HI	J1 AH	MUX 42 HI A12 37 NOTE 3 BLK
0820	MUX 42 LO	J1 AS	MUX 42 LO A12 36 NOTE 3 WHT
0830	MUX 42 SH	J1 BA	MUX 42 SH A12 35 NOTE 3 SHLD
0840	MUX 43 HI	J1 AM	MUX 43 HI A12 02 NOTE 3 BLK
0850	MUX 43 LO	J1 AW	MUX 43 LO A12 03 NOTE 3 WHT
0860	MUX 43 SH	J1 BE	MUX 43 SH A12 01 NOTE 3 SHLD
0870	MUX 44 HI	J1 BF	MUX 44 HI A13 37 NOTE 3 BLK
0880	MUX 44 LO	J1 BR	MUX 44 LO A13 36 NOTE 3 WHT
0890	MUX 44 SH	J1 BZ	MUX 44 SH A13 35 NOTE 3 SHLD
0900	MUX 45 HI	J1 BL	MUX 45 HI A13 02 NOTE 3 BLK
0910	MUX 45 LO	J1 BV	MUX 45 LO A13 03 NOTE 3 WHT
0920	MUX 45 SH	J1 CD	MUX 45 SH A13 01 NOTE 3 SHLD
0930	MUX 46 HI	J1 BH	MUX 46 HI A14 37 NOTE 3 BLK
0940	MUX 46 LO	J1 BS	MUX 46 LO A14 36 NOTE 3 WHT
0950	MUX 46 SH	J1 CA	MUX 46 SH A14 35 NOTE 3 SHLD
0960	MUX 47 HI	J1 BM	MUX 47 HI A14 02 NOTE 3 BLK
0970	MUX 47 LO	J1 BW	MUX 47 LO A14 03 NOTE 3 WHT
0980	MUX 47 SH	J1 CE	MUX 47 SH A14 01 NOTE 3 SHLD
0990	MUX 48 HI	J1 BJ	MUX 48 HI A15 37 NOTE 3 BLK
1000	MUX 48 LO	J1 BT	MUX 48 LO A15 36 NOTE 3 WHT
1010	MUX 48 SH	J1 CB	MUX 48 SH A15 35 NOTE 3 SHLD
1020	MUX 49 HI	J1 BN	MUX 49 HI A15 02 NOTE 3 BLK
1030	MUX 49 LO	J1 BX	MUX 49 LO A15 03 NOTE 3 WHT
1040	MUX 49 SH	J1 CF	MUX 49 SH A15 01 NOTE 3 SHLD
1050	MUX 50 HI	J1 BK	MUX 50 HI A16 37 NOTE 3 BLK
1060	MUX 50 LO	J1 BU	MUX 50 LO A16 36 NOTE 3 WHT
1070	MUX 50 SH	J1 CC	MUX 50 SH A16 35 NOTE 3 SHLD
1080	MUX 51 HI	J1 BP	MUX 51 HI A16 02 NOTE 3 BLK
1090	MUX 51 LO	J1 BY	MUX 51 LO A16 03 NOTE 3 WHT
1100	MUX 51 SH	J1 CH	MUX 51 SH A16 01 NOTE 3 SHLD
1110	MUX 52 HI	J1 CJ	MUX 52 HI A17 37 NOTE 3 BLK

SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
MUX 52 LO	J1 CN MUX 52 LO	A17 36 NOTE 3 WHT
MUX 52 SH	J1 CK MUX 52 SH	A17 35 NOTE 3 SHLD
MUX 53 HI	J1 CP MUX 53 HI	A17 02 NOTE 3 BLK
MUX 53 LO	J1 CL MUX 53 LO	A17 03 NOTE 3 WHT
MUX 53 SH	J1 CR MUX 53 SH	A17 01 NOTE 3 SHLD
ANALOG GRD	J1 CM ANALOG GRD	A04 06 NOTE 1
ANALOG GRD	J1 CS ANALOG GRD	A04 06 NOTE 1

SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
CONNECTOR J2 ANALOG INPUTS 54-55 & 64 TO 95 MRAC 104S-J6		
MUX 54 HI	J2 A MUX 54 HI	A18 37 NOTE 3 BLK
MUX 54 LO	J2 K MUX 54 LO	A18 36 NOTE 3 WHT
MUX 54 SH	J2 U MUX 54 SH	A18 35 NOTE 3 SHLD
MUX 55 HI	J2 E MUX 55 HI	A18 02 NOTE 3 BLK
MUX 55 LO	J2 P MUX 55 LO	A18 03 NOTE 3 WHT
MUX 55 SH	J2 Y MUX 55 SH	A18 01 NOTE 3 SHLD
MUX 64 HI	J2 B MUX 64 HI	B01 16 NOTE 3 BLK
MUX 64 LO	J2 L MUX 64 LO	B02 16 NOTE 3 WHT
MUX 64 SH	J2 V MUX 64 SH	B01 15 NOTE 3 SHLD
MUX 65 HI	J2 F MUX 65 HI	B01 12 NOTE 3 BLK
MUX 65 LO	J2 R MUX 65 LO	B02 12 NOTE 3 WHT
MUX 65 SH	J2 Z MUX 65 SH	B01 11 NOTE 3 SHLD
MUX 66 HI	J2 C MUX 66 HI	B01 08 NOTE 3 BLK
MUX 66 LO	J2 M MUX 66 LO	B02 08 NOTE 3 WHT
MUX 66 SH	J2 W MUX 66 SH	B01 07 NOTE 3 SHLD
MUX 67 HI	J2 H MUX 67 HI	B01 04 NOTE 3 BLK
MUX 67 LO	J2 S MUX 67 LO	B02 04 NOTE 3 WHT
MUX 67 SH	J2 -A MUX 67 SH	B01 03 NOTE 3 SHLD
MUX 68 HI	J2 D MUX 68 HI	B03 16 NOTE 3 BLK
MUX 68 LO	J2 N MUX 68 LO	B04 16 NOTE 3 WHT
MUX 68 SH	J2 X MUX 68 SH	B03 15 NOTE 3 SHLD
MUX 69 HI	J2 J MUX 69 HI	B03 12 NOTE 3 BLK
MUX 69 LO	J2 T MUX 69 LO	B04 12 NOTE 3 WHT
MUX 69 SH	J2 -B MUX 69 SH	B03 11 NOTE 3 SHLD
MUX 70 HI	J2 -C MUX 70 HI	B03 08 NOTE 3 BLK
MUX 70 LO	J2 -M MUX 70 LO	B04 08 NOTE 3 WHT
MUX 70 SH	J2 -V MUX 70 SH	B03 07 NOTE 3 SHLD
MUX 71 HI	J2 -H MUX 71 HI	B03 04 NOTE 3 BLK
MUX 71 LO	J2 -R MUX 71 LO	B04 04 NOTE 3 WHT
MUX 71 SH	J2 -Z MUX 71 SH	B03 03 NOTE 3 SHLD
MUX 72 HI	J2 -D MUX 72 HI	B05 16 NOTE 3 BLK
MUX 72 LO	J2 -N MUX 72 LO	B06 16 NOTE 3 WHT
MUX 72 SH	J2 -W MUX 72 SH	B05 15 NOTE 3 SHLD
MUX 73 HI	J2 -I MUX 73 HI	B05 12 NOTE 3 BLK
MUX 73 LO	J2 -S MUX 73 LO	B06 12 NOTE 3 WHT
MUX 73 SH	J2 AA MUX 73 SH	B05 11 NOTE 3 SHLD
MUX 74 HI	J2 -F MUX 74 HI	B05 08 NOTE 3 BLK
MUX 74 LO	J2 -P MUX 74 LO	B06 08 NOTE 3 WHT
MUX 74 SH	J2 -X MUX 74 SH	B05 07 NOTE 3 SHLD
MUX 75 HI	J2 -J MUX 75 HI	B05 04 NOTE 3 BLK
MUX 75 LO	J2 -T MUX 75 LO	B06 04 NOTE 3 WHT
MUX 75 SH	J2 AB MUX 75 SH	B05 03 NOTE 3 SHLD
MUX 76 HI	J2 -G MUX 76 HI	B07 16 NOTE 3 BLK
MUX 76 LO	J2 -Q MUX 76 LO	B08 16 NOTE 3 WHT
MUX 76 SH	J2 -Y MUX 76 SH	B07 15 NOTE 3 SHLD
MUX 77 HI	J2 -K MUX 77 HI	B07 12 NOTE 3 BLK
MUX 77 LO	J2 -U MUX 77 LO	B08 12 NOTE 3 WHT

SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
MUX 77 SH	J2 AC MUX 77 SH	B07 11 NOTE 3 SHLD
MUX 78 HI	J2 AD MUX 78 HI	B07 08 NOTE 3 BLK
MUX 78 LO	J2 AN MUX 78 LO	B08 08 NOTE 3 WHT
MUX 78 SH	J2 AX MUX 78 SH	B07 07 NOTE 3 SHLD
MUX 79 HI	J2 AJ MUX 79 HI	B07 04 NOTE 3 BLK
MUX 79 LO	J2 AT MUX 79 LO	B08 04 NOTE 3 WHT
MUX 79 SH	J2 BB MUX 79 SH	B07 03 NOTE 3 SHLD
MUX 80 HI	J2 AE MUX 80 HI	B09 16 NOTE 3 BLK
MUX 80 LO	J2 AP MUX 80 LO	B10 16 NOTE 3 WHT
MUX 80 SH	J2 AY MUX 80 SH	B09 15 NOTE 3 SHLD
MUX 81 HI	J2 AK MUX 81 HI	B09 12 NOTE 3 BLK
MUX 81 LO	J2 AU MUX 81 LO	B10 12 NOTE 3 WHT
MUX 81 SH	J2 BC MUX 81 SH	B09 11 NOTE 3 SHLD
MUX 82 HI	J2 AF MUX 82 HI	B09 08 NOTE 3 BLK
MUX 82 LO	J2 AR MUX 82 LO	B10 08 NOTE 3 WHT
MUX 82 SH	J2 AZ MUX 82 SH	B09 07 NOTE 3 SHLD
MUX 82 HI	J2 AL MUX 83 HI	B09 04 NOTE 3 BLK
MUX 83 LO	J2 AV MUX 83 LO	B10 04 NOTE 3 WHT
MUX 83 SH	J2 BD MUX 83 SH	B09 03 NOTE 3 SHLD
MUX 84 HI	J2 AH MUX 84 HI	B11 16 NOTE 3 BLK
MUX 84 LO	J2 AS MUX 84 LO	B12 16 NOTE 3 WHT
MUX 84 SH	J2 BA MUX 84 SH	B11 15 NOTE 3 SHLD
MUX 85 HI	J2 AM MUX 85 HI	B11 12 NOTE 3 BLK
MUX 85 LO	J2 AW MUX 85 LO	B12 12 NOTE 3 WHT
MUX 85 SH	J2 BE MUX 85 SH	B11 11 NOTE 3 SHLD
MUX 86 HI	J2 BF MUX 86 HI	B11 08 NOTE 3 BLK
MUX 86 LO	J2 BR MUX 86 LO	B12 08 NOTE 3 WHT
MUX 86 SH	J2 BZ MUX 86 SH	B11 07 NOTE 3 SHLD
MUX 87 HI	J2 BL MUX 87 HI	B11 04 NOTE 3 BLK
MUX 87 LO	J2 BV MUX 87 LO	B12 04 NOTE 3 WHT
MUX 87 SH	J2 CD MUX 87 SH	B11 02 NOTE 3 SHLD
MUX 88 HI	J2 BH MUX 88 HI	B13 16 NOTE 3 BLK
MUX 88 LO	J2 BS MUX 88 LO	B14 16 NOTE 3 WHT
MUX 88 SH	J2 CA MUX 88 SH	B13 15 NOTE 3 SHLD
MUX 89 HI	J2 BM MUX 89 HI	B13 12 NOTE 3 BLK
MUX 89 LO	J2 BW MUX 89 LO	B14 12 NOTE 3 WHT
MUX 89 SH	J2 CE MUX 89 SH	B13 11 NOTE 3 SHLD
MUX 90 HI	J2 BJ MUX 90 HI	B13 08 NOTE 3 BLK
MUX 90 LO	J2 BT MUX 90 LO	B14 08 NOTE 3 WHT
MUX 90 SH	J2 CB MUX 90 SH	B13 07 NOTE 3 SHLD
MUX 91 HI	J2 BN MUX 91 HI	B13 04 NOTE 3 BLK
MUX 91 LO	J2 BX MUX 91 LO	B14 04 NOTE 3 WHT
MUX 91 SH	J2 CF MUX 91 SH	B13 03 NOTE 3 SHLD
MUX 92 HI	J2 BK MUX 92 HI	B15 16 NOTE 3 BLK
MUX 92 LO	J2 BU MUX 92 LO	B16 16 NOTE 3 WHT
MUX 92 SH	J2 CC MUX 92 SH	B15 15 NOTE 3 SHLD
MUX 93 HI	J2 BP MUX 93 HI	B15 12 NOTE 3 BLK
MUX 93 LO	J2 BY MUX 93 LO	B16 12 NOTE 3 WHT
MUX 93 SH	J2 CH MUX 93 SH	B15 11 NOTE 3 SHLD
MUX 94 HI	J2 CJ MUX 94 HI	B15 08 NOTE 3 BLK

SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
MUX 94 LO	J2 CN MUX 94 LO	B16 08 NOTE 3 WHT
MUX 94 SH	J2 CK MUX 94 SH	B15 07 NOTE 3 SHLD
MUX 95 HI	J2 CP MUX 95 HI	B15 04 NOTE 3 BLK
MUX 95 LO	J2 CL MUX 95 LO	B16 04 NOTE 3 WHT
MUX 95 SH	J2 CR MUX 95 SH	B15 03 NOTE 3 SHLD
ANALOG GRD	J2 CM ANALOG GRD	B01 19 NOTE 1
ANALOG GRD	J2 CS ANALOG GRD	B01 19 NOTE 1

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
2250	P	CONNECTOR J3 ANALOG INPUTS 96-103		
2260		MRAC 34S-J6		
2270	1	MUX 96 HI	J3 A MUX 96 HI	B17 16 NOTE 3 BLK
2280		MUX 96 LO	J3 E MUX 96 LO	B18 16 NOTE 3 WHT
2290		MUX 96 SH	J3 K MUX 96 SH	B17 15 NOTE 3 SHLD
2300		MUX 97 HI	J3 B MUX 97 HI	B17 12 NOTE 3 BLK
2310		MUX 97 LO	J3 F MUX 97 LO	B18 12 NOTE 3 WHT
2320		MUX 97 SH	J3 L MUX 97 SH	B17 11 NOTE 3 SHLD
2330		MUX 98 HI	J3 C MUX 98 HI	B17 08 NOTE 3 BLK
2340		MUX 98 LO	J3 H MUX 98 LO	B18 08 NOTE 3 WHT
2350		MUX 98 SH	J3 M MUX 98 SH	B17 07 NOTE 3 SHLD
2360		MUX 99 HI	J3 D MUX 99 HI	B17 04 NOTE 3 BLK
2370		MUX 99 LO	J3 J MUX 99 LO	B18 04 NOTE 3 WHT
2380		MUX 99 SH	J3 N MUX 99 SH	B17 03 NOTE 3 SHLD
2390		MUX100 HI	J3 P MUX100 HI	B19 16 NOTE 3 BLK
2400		MUX100 LO	J2 U MUX100 LO	B20 16 NOTE 3 WHT
2410		MUX100 SH	J3 Y MUX100 SH	B19 15 NOTE 3 SHLD
2420		MUX101 HI	J3 T MUX101 HI	B19 12 NOTE 3 BLK
2430		MUX101 LO	J3 X MUX101 LO	B20 12 NOTE 3 WHT
2440		MUX101 SH	J3 -B MUX101 SH	B19 11 NOTE 3 SHLD
2450		MUX102 HI	J3 R MUX102 HI	B19 08 NOTE 3 BLK
2460		MUX102 LO	J3 V MUX102 LO	B20 08 NOTE 3 WHT
2470		MUX102 SH	J3 Z MUX102 SH	B19 07 NOTE 3 SHLD
2480		MUX103 HI	J3 S MUX103 HI	B19 04 NOTE 3 BLK
2490		MUX103 LO	J3 W MUX103 LO	B20 04 NOTE 3 WHT
2500		MUX103 SH	J3 -A MUX103 SH	B19 03 NOTE 3 SHLD
2510		BLANK	J3 -C BLANK	
2520		BLANK	J3 -H BLANK	
2530		BLANK	J3 -M BLANK	
2540		BLANK	J3 -D BLANK	
2550		BLANK	J3 -I BLANK	
2560		BLANK	J3 -N BLANK	
2570		BLANK	J3 -G BLANK	
2580		BLANK	J3 -K BLANK	
2590		ANALOG GRD	J3 -F ANALOG GRD	B08 19 NOTE 1
2600		ANALOG GRD	J3 -J ANALOG GRD	B08 19 NOTE 1

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
2610	P	CONNECTOR J4 DIGITAL ADDRESS & CONTROLS FROM ADC		
2620		MRAC 50S-J6		
2630	1	MUXAD 01*	J4 A MUXAD01*	C06 01 NOTE 2
2640		MUXAD 01*SH	J4 B MUXAD01*SH	C06 38 NOTE 2
2650		MUXAD 02*	J4 C MUXAD02*	C06 09 NOTE 2
2660		MUXAD 02*SH	J4 D MUXAD02*SH	C06 38 NOTE 2
2670		MUXAD 04*	J4 E MUXAD04*	C06 17 NOTE 2
2680		MUXAD 04*SH	J4 F MUXAD04*SH	C06 38 NOTE 2
2690		FIELD 02*	J4 H FIELD02*	C06 25 NOTE 2
2700		FIELD 02*SH	J4 J FIELD02*SH	C06 38 NOTE 2
2710		FIELD 03*	J4 K FIELD03*	C06 27 NOTE 2
2720		FIELD 03*SH	J4 L FIELD03*SH	C06 38 NOTE 2
2730		FIELD 04*	J4 M FIELD04*	C06 30 NOTE 2
2740		FIELD 04*SH	J4 N FIELD04*SH	C06 38 NOTE 2
2750		FIELD 05*	J4 P FIELD05*	C06 32 NOTE 2
2760		FIELD 05*SH	J4 R FIELD05*SH	C06 38 NOTE 2
2770		FIELD 06*SH	J4 S FIELD06*SH	C06 33 NOTE 2
2780		FIELD 06*SH	J4 T FIELD06*SH	C06 38 NOTE 2
2790		FIELD 07*	J4 U FIELD07*	C08 01 NOTE 2
2800		FIELD 07*SH	J4 V FIELD07*SH	C08 38 NOTE 2
2810		FIELD 08*	J4 W FIELD 08*	C08 03 NOTE 2
2820		FIELD 08*SH	J4 X FIELD 08*SH	C08 38 NOTE 2
2830		FIELD 09*	J4 Y FIELD 09*	C08 06 NOTE 2
2840		FIELD 09*SH	J4 Z FIELD 09*SH	C08 38 NOTE 2
2850		FIELD 10*	J4 -A FIELD 10*	C08 08 NOTE 2
2860		FIELD 10*SH	J4 -B FIELD 10*SH	C08 38 NOTE 2
2870		FIELD 11*	J4 -C FIELD 11*	C08 09 NOTE 2
2880		FIELD 11*SH	J4 -D FIELD 11*SH	C08 38 NOTE 2
2890		FIELD 12*	J4 -E FIELD 12*	C08 11 NOTE 2
2900		FIELD 12*SH	J4 -F FIELD 12*SH	C08 38 NOTE 2
2910		FIELD 13*	J4 -H FIELD 13*	C08 14 NOTE 2
2920		FIELD 13*SH	J4 -J FIELD 13*SH	C08 38 NOTE 2
2930		FIELD 14*	J4 -K FIELD 14*	C08 16 NOTE 2
2940		FIELD 14*SH	J4 -M FIELD 14*SH	C08 38 NOTE 2
2950		FIELD 15*	J4 -N FIELD 15*	C08 17 NOTE 2
2960		FIELD 15*SH	J4 -P FIELD 15*SH	C08 38 NOTE 2

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
2970	P	BLANK	J4 -R BLANK	
2980		BLANK	J4 -S BLANK	
2990		BLANK	J4 -T BLANK	
3000		BLANK	J4 -U BLANK	
3010		BLANK	J4 -V BLANK	
3020		BLANK	J4 -W BLANK	
3030		BLANK	J4 -X BLANK	
3040		BLANK	J4 -Y BLANK	
3050		BLANK	J4 -Z BLANK	
3060		BLANK	J4 AA BLANK	
3070		BLANK	J4 BB BLANK	
3080		BLANK	J4 CC BLANK	
3090		BLANK	J4 DD BLANK	
3100		BLANK	J4 EE BLANK	
3110		LOGIC GRD	J4 FF LOGIC GRD	C06 38 NOTE 1
3120		LOGIC GRD	J4 HH LOGIC GRD	C06 38 NOTE 1

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
3130	P	CONNECTOR J5 ANALOG TO ADC MODULE		
3140		MS3102A-14S-5S		
3150	1	ANALOG OUT	J5 A ANALOG OUT	C03 22 NOTE 2
3160		GUARD SHLD	J5 B GUARD SHLD	C03 21 NOTE 2
3170		BLANK	J5 C BLANK	
3180		ANALOG GRD	J5 D ANALOG GRD	A03 34 NOTE 1
3190		ANALOG GRD	J5 E ANALOG GRD	A03 34 NOTE 1
3200	2	CONNECTOR J6 ANALOG OUTPUT		
3210		MS3102A-14S-5S		
3220	1	ANALOG OUT	J6 A ANALOG OUT	C04 22 NOTE 2
3230		GUARD SHLD	J6 B GUARD SHLD	C03 21 NOTE 2
3240		BLANK	J6 C BLANK	
3250		ANALOG GRD	J6 D ANALOG GRD	C04 16 NOTE 1
3260		ANALOG GRD	J6 E ANALOG GRD	C04 16 NOTE 1
3270	2	CONNECTOR J7 ANALOG OUTPUT		
3280		MS3102A-14S-5S		
3290	1	ANALOG OUT	J7 A ANALOG OUT	C04 22 NOTE 2
3300		GUARD SHLD	J7 B GUARD SHLD	C03 21 NOTE 2
3310		BLANK	J7 C BLANK	
3320		ANALOG GRD	J7 D ANALOG GRD	C04 16 NOTE 1
3330		ANALOG GRD	J7 E ANALOG GRD	C04 16 NOTE 1

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
3340	P	CONNECTOR JB ANALOG OUT CONTINUOUS		
3350		MRAC 18S-J6		
3360	1	ANAOT 20 J8 A	ANAOT 20 A01 32	NOTE 2
3370		ANAOT 20 SH J8 B	ANAOT 20 SH A01 34	NOTE 2
3380		ANAOT 21 J8 C	ANAOT 21 A01 07	NOTE 2
3390		ANAOT 21 SH J8 D	ANAOT 21 SH A01 06	NOTE 2
3400		ANAOT 32 J8 E	ANAOT 32 A07 32	NOTE 2
3410		ANAOT 32 SH J8 F	ANAOT 32 SH A07 34	NOTE 2
3420		ANAOT 33 J8 H	ANAOT 33 A07 07	NOTE 2
3430		ANAOT 33 SH J8 J	ANAOT 33 SH A07 06	NOTE 2
3440		ANAOT 40 J8 K	ANAOT 40 A11 32	NOTE 2
3450		ANAOT 40 SH J8 L	ANAOT 40 SH A11 34	NOTE 2
3460		ANAOT 41 J8 M	ANAOT 41 A11 07	NOTE 2
3470		ANAOT 41 SH J8 N	ANAOT 41 SH A11 06	NOTE 2
3480		ANAOT 52 J8 P	ANAOT 52 A17 32	NOTE 2
3490		ANAOT 52 SH J8 R	ANAOT 52 SH A17 34	NOTE 2
3500		ANAOT 53 J8 S	ANAOT 53 A17 07	NOTE 2
3510		ANAOT 53 SH J8 T	ANAOT 53 SH A17 06	NOTE 2
3520		ANALOG GRD J8 U	ANALOG GRD A05 06	NOTE 1
3530		ANALOG GRD J8 V	ANALOG GRD A05 06	NOTE 1

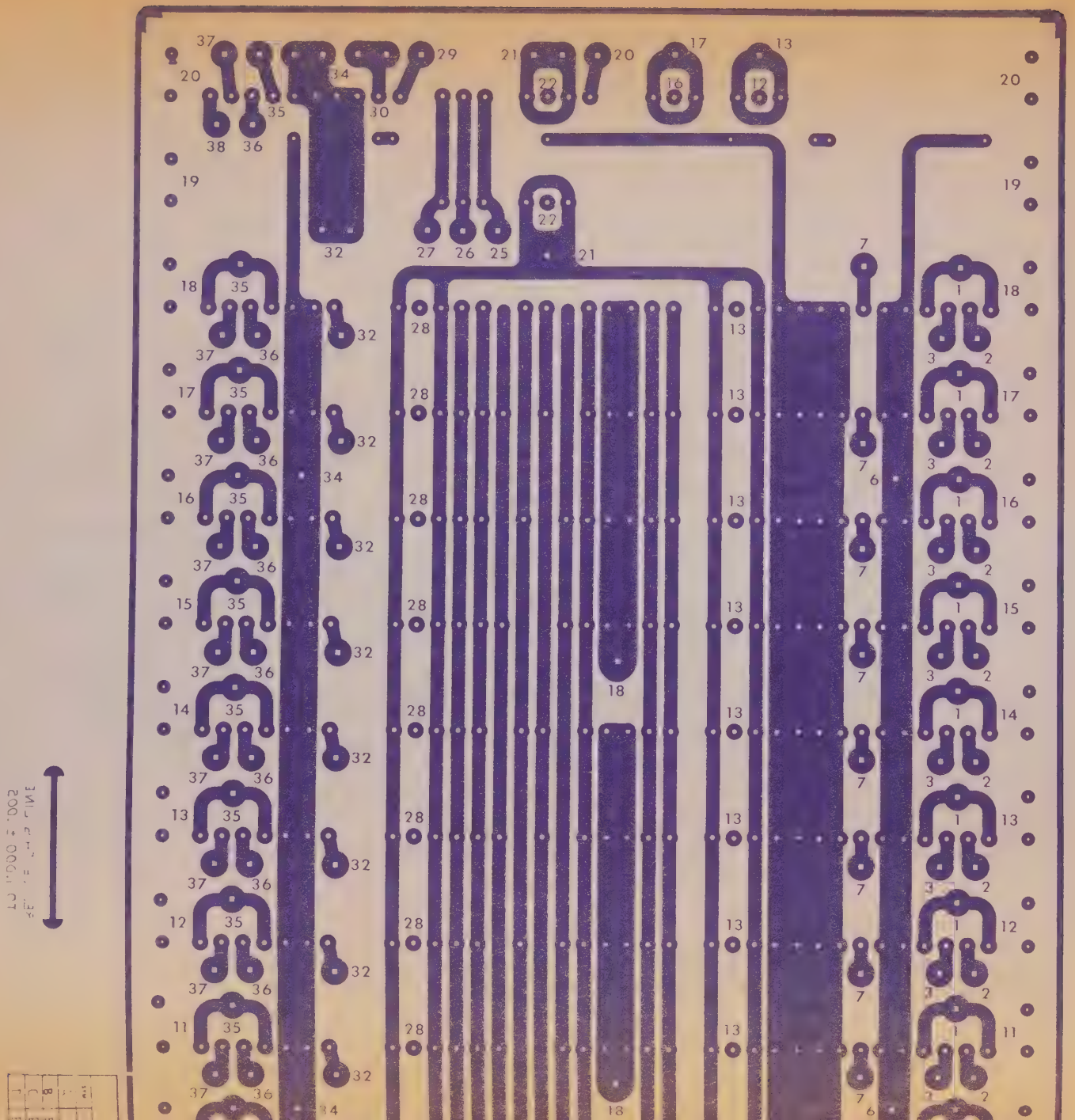
		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
3540	P	INTERCONNECT WIRING		
3550	1	MUX OUT HI C01 22	MDAMP HI C03 16	NOTE 2
3560		GUARD C01 21	GUARD C03 17	NOTE 2
3570		MUX OUT LO C02 22	MDAMP LO C03 12	NOTE 2
3580		GUARD C02 21	GUARD C03 13	NOTE 2
3590		MUX OUT C03 22	BFR HI C04 08	NOTE 2
3600		GUARD C03 21	BFR GD C04 07	NOTE 2
3610		MUX HI B01 22	GUARD IN HI C01 22	NOTE 2
3620		GUARD B01 21	GUARD C01 21	NOTE 2
3630		MUX LO B02 22	GUARD IN LO C02 22	NOTE 2
3640		GUARD B02 21	GUARD C02 21	NOTE 2
3650		MUX OUT A01 28	MUX OUT C03 22	NOTE 2
3660		GUARD A01 29	GUARD C03 21	NOTE 2
3670		BFR LO C04 13	GRD C04 16	
3680		BFR LODG C04 11	GRD C04 16	
3690		BFR ZERO C04 05	GRD C04 16	
3700		FIELD 2 A01 18	FIELD 2 C06 26	
3710		FIELD 3 A03 18	FIELD 3 C06 28	
3720		FIELD 4 A07 18	FIELD 4 C06 29	
3730		FIELD 5 A11 18	FIELD 5 C06 31	
3740		FIELD 6 A15 18	FIELD 6 C06 34	
3750		FIELD 8 * C08 04	FIELD 8 * B04 34	
3760		FIELD 9 * C08 05	FIELD 9 * B08 34	
3770		FIELD 10 * C08 07	FIELD 10* B12 34	
3780		FIELD 11 * C08 10	FIELD 11* B16 34	
3790		FIELD 12 * C08 12	FIELD 12* B20 34	
3800		FIELD 8 * C08 04	FIELD 8 * C03 38	
3810		FIELD 9 * C08 05	FIELD 9 * C03 37	
3820		FIELD 10 * C08 07	FIELD 10* C03 36	
3830		FIELD 11 * C08 10	FIELD 11* C03 35	
3840		FIELD 12 * C08 12	FIELD 12* C03 34	
3850		FIELD 13 * C08 13	FIELD 13* C03 33	
3860		FIELD 14 * C08 15	FIELD 14* C03 32	
3870		FIELD 15 * C08 18	FIELD 15* C03 31	
3880		DECODE 4* A01 22	DECODE 4* C06 20	
3890		DECODE 4* B01 36	DECODE 4* C06 21	
3900		DECODE 4 A01 21	DECODE 4 C06 23	
3910		DECODE 4 B01 35	DECODE 4 C06 18	
3920		DECODE 2* A01 24	DECODE 2* C06 15	
3930		DECODE 2* B01 37	DECODE 2* C06 13	
3940		DECODE 2 A01 23	DECODE 2 C06 10	
3945		DECODE 2 B11 37	DECODE 2 C06 13	
3950		DECODE 1* A01 26	DECODE 1* C06 07	
3960		DECODE 1* A09 26	DECODE 1* C06 07	
3970		DECODE 1* B01 38	DECODE 1* C06 05	
3980		DECODE 1* B11 38	DECODE 1* C06 05	
3990		DECODE 1 A01 25	DECODE 1 C06 04	
4000		DECODE 1 A09 25	DECODE 1 C06 02	

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
4010	P	STRAP THE BIFURCATED TERMINALS TOGETHER		
4020		PER NOTE 5		
4030	2	STRAP PINS 22 TOGETHER		
4040	1	B01 22		
4050		B03 22		
4060		B05 22		
4070		B07 22		
4080		B09 22		
4090		B11 22		
4100		B13 22		
4110		B15 22		
4120		B17 22		
4130		B19 22		
4140	1	STRAP PINS 22 TOGETHER		
4150	1	B02 22		
4160		B04 22		
4170		B06 22		
4180		B08 22		
4190		B10 22		
4200		B12 22		
4210		B14 22		
4220		B16 22		
4230		B18 22		
4240		B20 22		

		SIGNAL,PLUG,PIN	SIGNAL,PLUG,PIN	NOTES
4250	P	STRAP PINS 28 TOGETHER		
4260	1	A01 28		
4270		A02 28		
4280		A03 28		
4290		A04 28		
4300		A05 28		
4310		A06 28		
4320		A07 28		
4330		A08 28		
4340		A09 28		
4350		A10 28		
4360		A11 28		
4370		A12 28		
4380		A13 28		
4390		A14 28		
4400		A15 28		
4410		A16 28		
4420		A17 28		
4430		A18 28		
4440	1	A18 28	A19 22	
4450	1	STRAP PINS 13 TOGETHER		
4460	1	A01 13		
4470		A02 13		
4480		A03 13		
4490		A04 13		
4500		A05 13		
4510		A06 13		
4520		A07 13		
4530		A08 13		
4540		A09 13		
4550		A10 13		
4560		A11 13		
4570		A12 13		
4580		A13 13		
4590		A14 13		
4600		A15 13		
4610		A16 13		
4620		A17 13		
4630		A18 13		
4640	1	A18 13	A19 22	

		SIGNAL	PLUG	PIN	SIGNAL	PLUG	PIN	NOTES
4650	P	POWER SUPPLY & GROUND WIRING						
4660	1	+10V	C12	09	+10V	C08	36	NOTE 1
4670		+10V	C12	09	+10V	C06	37	NOTE 1
4680		+10V	C12	09	+10V	C03	20	NOTE 1
4690		+10V	C12	09	+10V	B01	28	NOTE 1
4700		+10V	C12	09	+10V	A02	20	NOTE 1
4710		+32V	C12	12	+32V	A01	17	NOTE 1
4720		+32V	C12	12	+32V	A19	26	NOTE 1
4730		+32V	C12	12	+32V	B01	26	NOTE 1
4740		+32V	C12	12	+32V	C01	26	NOTE 1
4750		-32V	C12	13	-32V	A01	16	NOTE 1
4760		-32V	C12	13	-32V	A19	27	NOTE 1
4770		-32V	C12	13	-32V	B01	27	NOTE 1
4780		-32V	C12	13	-32V	C01	27	NOTE 1
4790		GROUND ANA	C04	16	GROUND ANA	B01	19	NOTE 1
4800		GROUND ANA	C04	16	GROUND ANA	B01	19	NOTE 1
4810		GROUND ANA	C03	30	GROUND ANA	B02	19	NOTE 1
4820		GROUND ANA	C03	30	GROUND ANA	B02	19	NOTE 1
4830		GROUND ANA	A02	06	GROUND ANA	B03	19	NOTE 1
4840		GROUND ANA	A02	06	GROUND ANA	B03	19	NOTE 1
4850		GROUND ANA	A03	34	GROUND ANA	B04	19	NOTE 1
4860		GROUND ANA	A03	34	GROUND ANA	B04	19	NOTE 1
4870		GROUND ANA	B04	19	GROUND ANA	C12	11	NOTE 1
4880		GROUND ANA	B04	19	GROUND ANA	C12	11	NOTE 1
4890		GROUND ANA	B05	19	GROUND ANA	C12	11	NOTE 1
4900		GROUND ANA	B05	19	GROUND ANA	C12	11	NOTE 1
4910		GROUND ANA	B01	30	GROUND ANA	B06	19	NOTE 1
4920		GROUND ANA	B01	30	GROUND ANA	B06	19	NOTE 1
4930		GROUND ANA	B02	01	GROUND ANA	B07	19	NOTE 1
4940		GROUND ANA	B02	01	GROUND ANA	B07	19	NOTE 1
4950		GROUND	B01	29	GROUND	C06	38	NOTE 1
4960		GROUND	B01	29	GROUND	C06	38	NOTE 1
4970		GROUND	A19	25	GROUND	C06	38	NOTE 1
4980		GROUND	B01	25	GROUND	C16	38	NOTE 1
4990		GROUND	C01	25	GROUND	C06	38	NOTE 1
5000		GROUND	C01	25	GROUND	C06	38	NOTE 1
5010		GROUND	C06	38	GROUND	A01	10	NOTE 1
5020		GROUND	C06	38	GROUND	A01	10	NOTE 1
5030		GROUND	C02	25	GROUND	C06	38	NOTE 1
5040		GROUND	C02	25	GROUND	C06	38	NOTE 1
5050		GROUND	A01	10	GROUND	C06	38	NOTE 1
5060		GROUND	A01	10	GROUND	C06	38	NOTE 1
5070		GROUND	C06	38	GROUND	C12	11	NOTE 1
5080		GROUND	C06	38	GROUND	C12	11	NOTE 1
5090		GROUND	C06	38	GROUND	C12	11	NOTE 1
5100		GROUND	C06	38	GROUND	C12	11	NOTE 1
5110		AMP IN	A20	16	MUX OT	A19	22	NOTE 2
5120		AMP GDSH	A20	17	MUX GD SH	A19	21	NOTE 2
5130		MUX OT	A20	22	MUX OT	C04	22	NOTE 2

	SIGNAL	PLUG	PIN	SIGNAL	PLUG	PIN	NOTES
5140	MUX GD	A20	21	MUX GD SH	C03	21	NOTE 2
5150	AMP INLO	A20	12	GRD	A20	30	
5160	GRD	A20	30	GRD	A17	34	NOTE 1
5170	+10V	A20	20	+10V	C12	09	NOTE 1
5180	F6,5,4,7	A20	34	FIELD	C06	32	
5190	F3	A20	35	FIELD	C06	33	DBL TP
5200	F2	A20	36	FIELD	C06	30	DBL TP
5210	F1	A20	37	FIELD	C06	27	DBL TP
5220	F0	A20	38	FIELD	C06	28	DBL TP
5230	FIELD	C06	20	FIELD	C08	25	
5240	FIELD	C06	26	FIELD	C08	27	

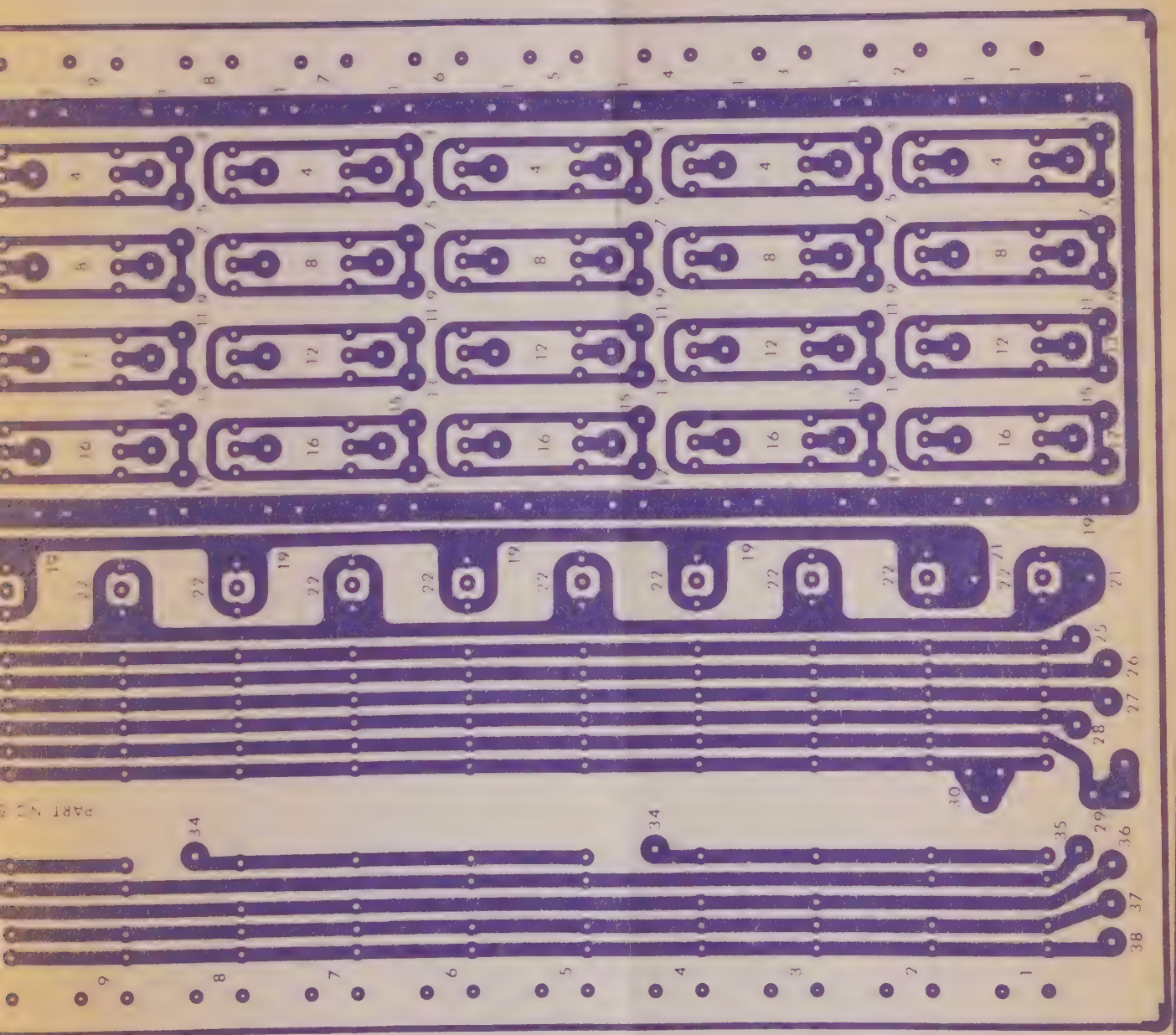


REVISIONS		
	DATE	APPROVAL
	7-24-74	
	11-23-74	
	6-17-75	
	8-4-77	

DRAWN M. J. Stem	DATE 6-1977	TITLE PRINTED CIRCUIT MASTER INTERCONNECT BD. "A"	PRESTON SCIENTIFIC INCORPORATED
CHD			
ENGR L. L. Stem		MATERIAL	
APPD			
APPD		FINISH	
58837		D	58836
NEXT ASSY		SCALE 2:1	SIZE CODE SH 1 OF 1

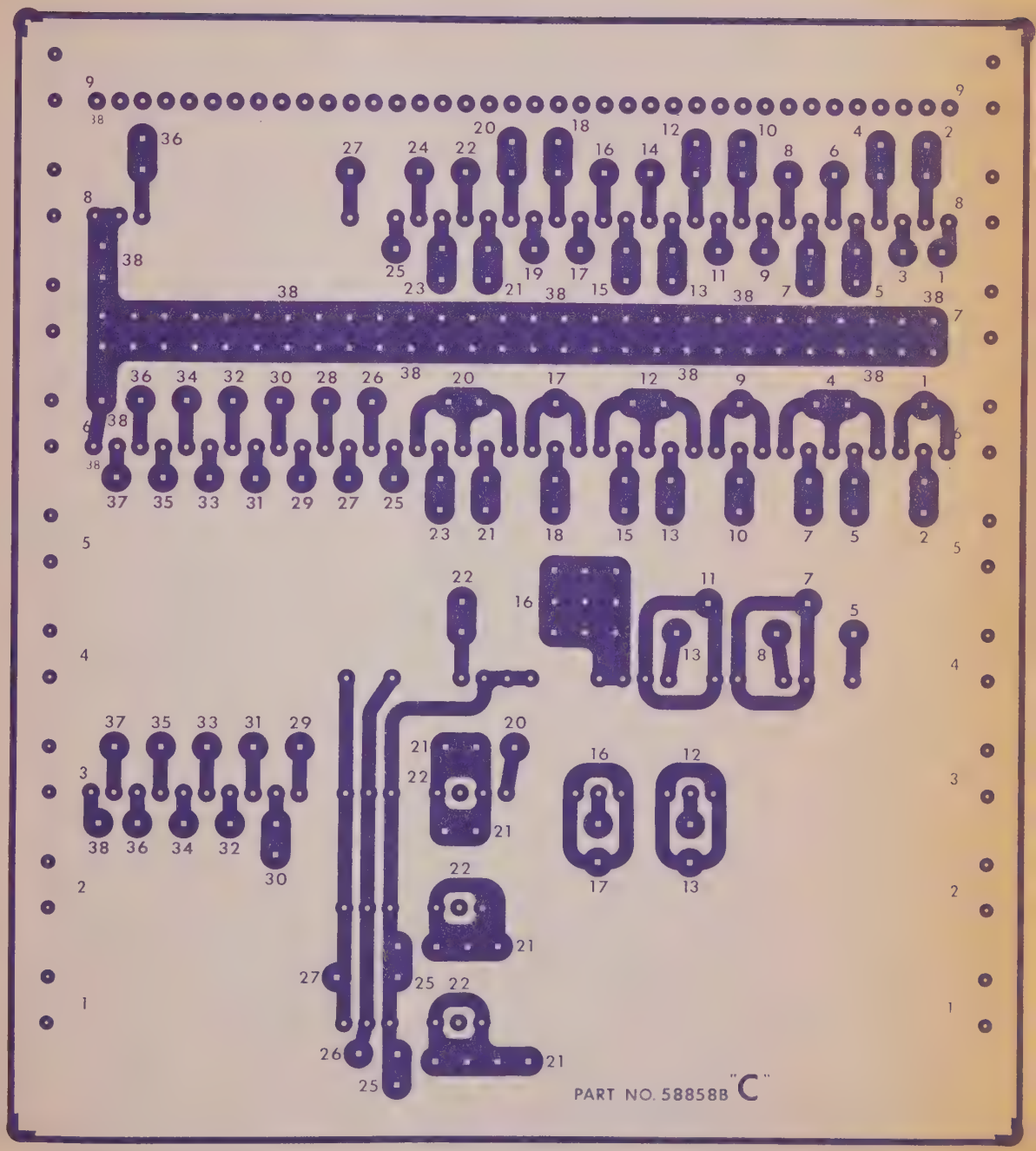
MASTER 86

838A B



DRAWN M. J. Stern	DATE 6-18-74	TITLE PRINTED CIRCUIT MASTER INTERCONNECT BD "B"	PRESTON SCIENTIFIC INCORPORATED
ENGR D. L. Dugan	6-22-74	MATERIAL	
APPD			
APPD		FINISH	
58839			58838
NEXT ASSY		SCALE 2	SIZE CODE — SH OF

11-23-74



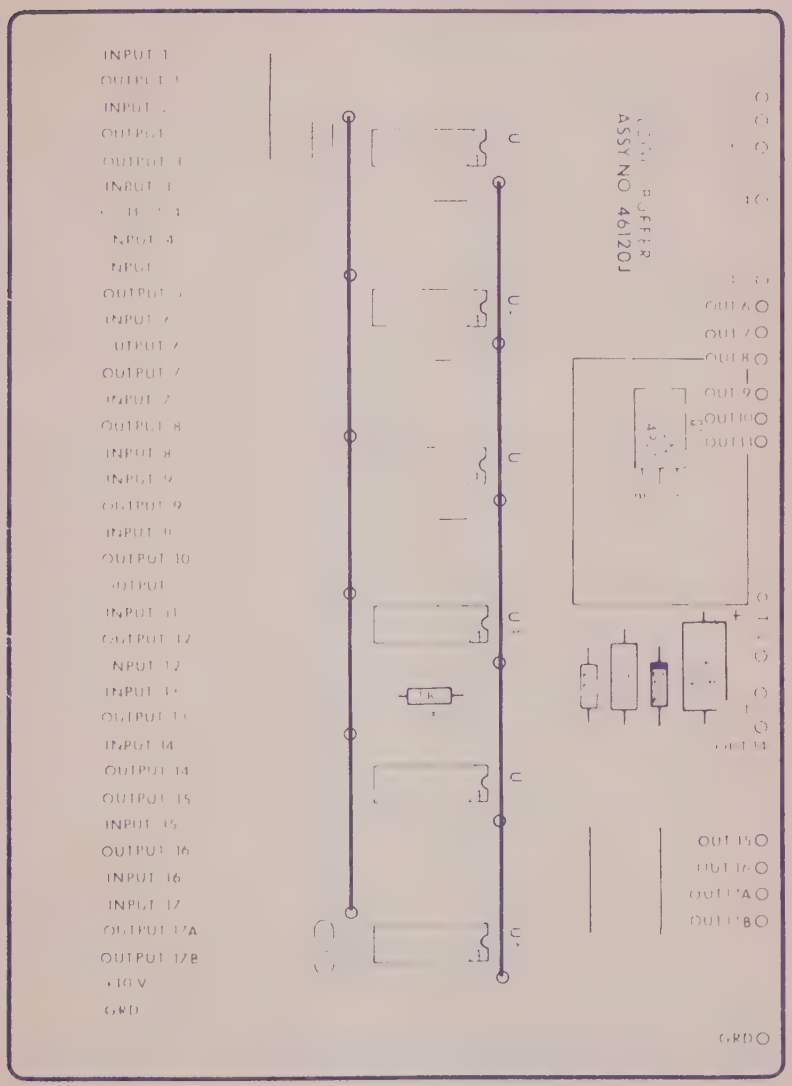
REVISIONS

A	E 05355	
B	E D 5327	

REDUCE THIS LINE TO 1.000 ± .005

PRINTED CIRCUIT MASTER INTERCONNECT BD "C"

A	[illegible]		
B	[illegible]		
D	[illegible]		
E	[illegible]		
F	5319		
G	5498		
H	[illegible]		
J	5868		



PRINTED CIRCUIT ASSY
LOGIC BUFFER

FOR NOTES SEE SH 2

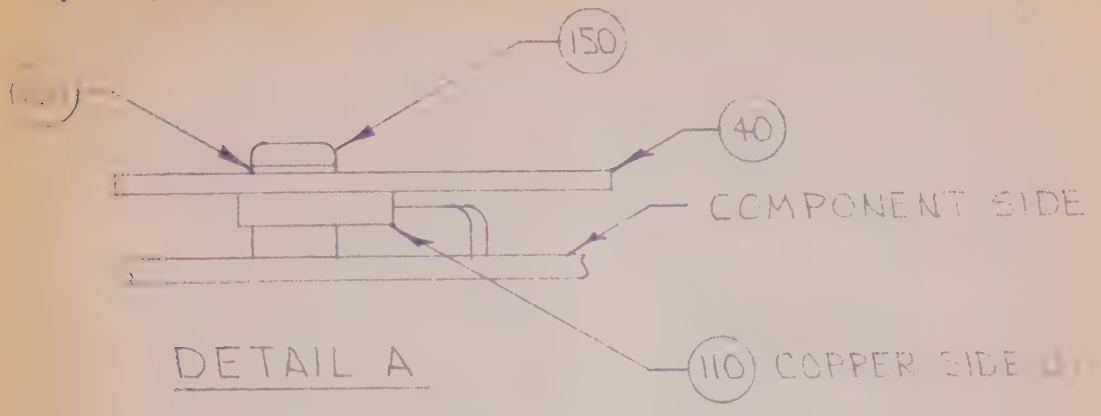
NEXT ASSY

2/1

MASTER # 54

46120-T

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
		SEE SHEET ONE		



DETAIL A

4. U1-U6 & R1 INSTALL PER TABULATION, SH 4 OF 4.
3. FOR HEATSINK ASSY SEE DETAIL A.
2. ALL CAPACITOR VALUES ARE UF.
1. FOR SCHEMATIC SEE DWG NO 46121-T.

NOTE: UNLESS OTHERWISE SPECIFIED

BY	DATE
DRAWN [illegible]	
CHK [illegible]	3-21-10
ENGR C. CALLAGHAN	4-2-10
APPD	
APPD	

TITLE PRINTED CIRCUIT ASSY LOGIC BUFFER

MATERIAL

FINISH

SCALE

SIZE A

PRESTON

SCIENTIFIC INCORPORATED
805 East Cerritos Ave., Anaheim, Calif. 92805
Tel. (714) 776-6400

46120-T

CODE

SH 2 OF 2

47060

TITLE: P.C. ASSY LOGIC BUFFER J
DWG NO. 46120-93 REV
SHEET 2 OF

PRESTON SCIENTIFIC INC.
PRINTED 10/24/75

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	46123-00	D&P ASSY LOGIC BUFFER	L
040	1	46079-00	HEATSINK	A
050	1	527-00	RESISTOR 1/4W 10%	220
060	1	[illegible]	RESISTOR 1/4W 10%	1K
070	1	560-00	RESISTOR 1/2W 10%	10
080	2	93-01	CAPACITOR 10%	.01UF
090	1	116-00	CAPACITOR	2UF 50V
100	1	244-08	DIODE ZENER	1N5232B
110	1	846-03	TRANSISTOR	2N4921
120	3	848-16	INTEGRATED CIRCUIT	74H08
130	1	848-12	INTEGRATED CIRCUIT	74H40
150	1	665-00	SCREW PHMS 4-40 X 5/16	
160	1	859-02	WASHER SHOULDER NYLON	

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHEET ONE		

46120-XX

TABULATION

DASH NO.	U1	U2	U3	U4	R1
0	74H08	74H08	74H08	74H08	INSTALL
1	74H08	74H08	74H08	OMIT	OMIT
2	74H08	74H08	OMIT	OMIT	OMIT
3	74H08	OMIT	OMIT	OMIT	OMIT
4	OMIT	OMIT	OMIT	OMIT	OMIT
5	74H00	74H00	74H00	74H00	INSTALL
6	74H08	74H08	74H08	74H00	INSTALL
7	74H08	74H00	OMIT	OMIT	OMIT
8	74H00	74H40	74H40	OMIT	OMIT
9	74H08	74H08	74H08	74H40	INSTALL

TABULATION

DASH NO.	U5	U6
0	MC3026P	MC3026P
1	MC3026P	OMIT
2	OMIT	MC3026P
3	OMIT	OMIT
4	74H40	74H40
5	MC3026P	74H40
6	74H40	OMIT

BY	DATE
DWN MONTOURE	
CHK L.E. PADILLA	
ENG L.E. PADILLA	
APP	

47060

NEXT ASSY

TITLE
PRINTED CIRCUIT ASSY
BUFFER AMPLIFIER

MAT'L

FINISH

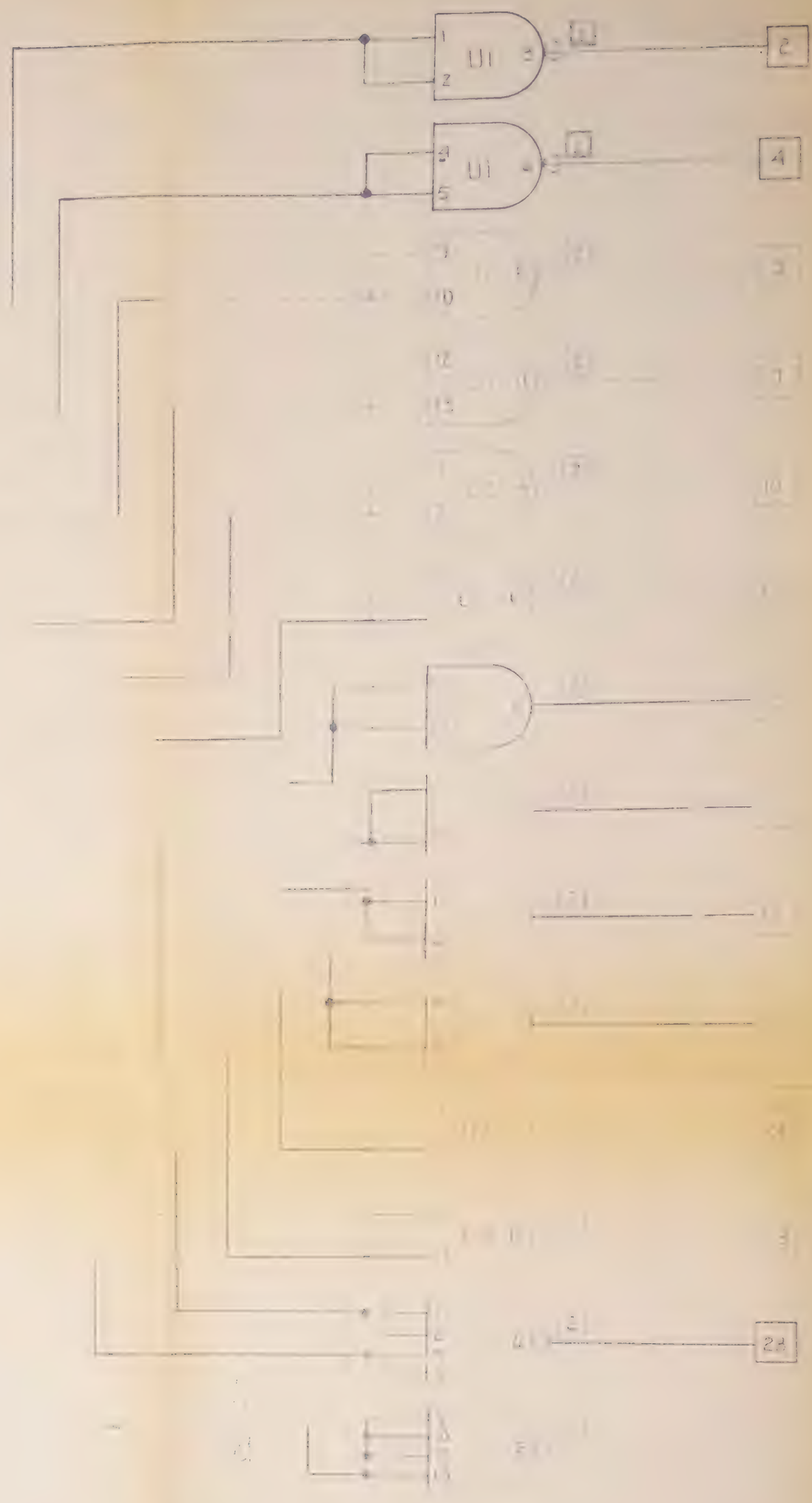
A
SIZE

PRESTON
SCIENTIFIC INCORPORATED
805 East Cerritos Ave. Anaheim Calif 92805
Tel (714) 776-6400

46120-T

SCALE

SH 4 OF 4

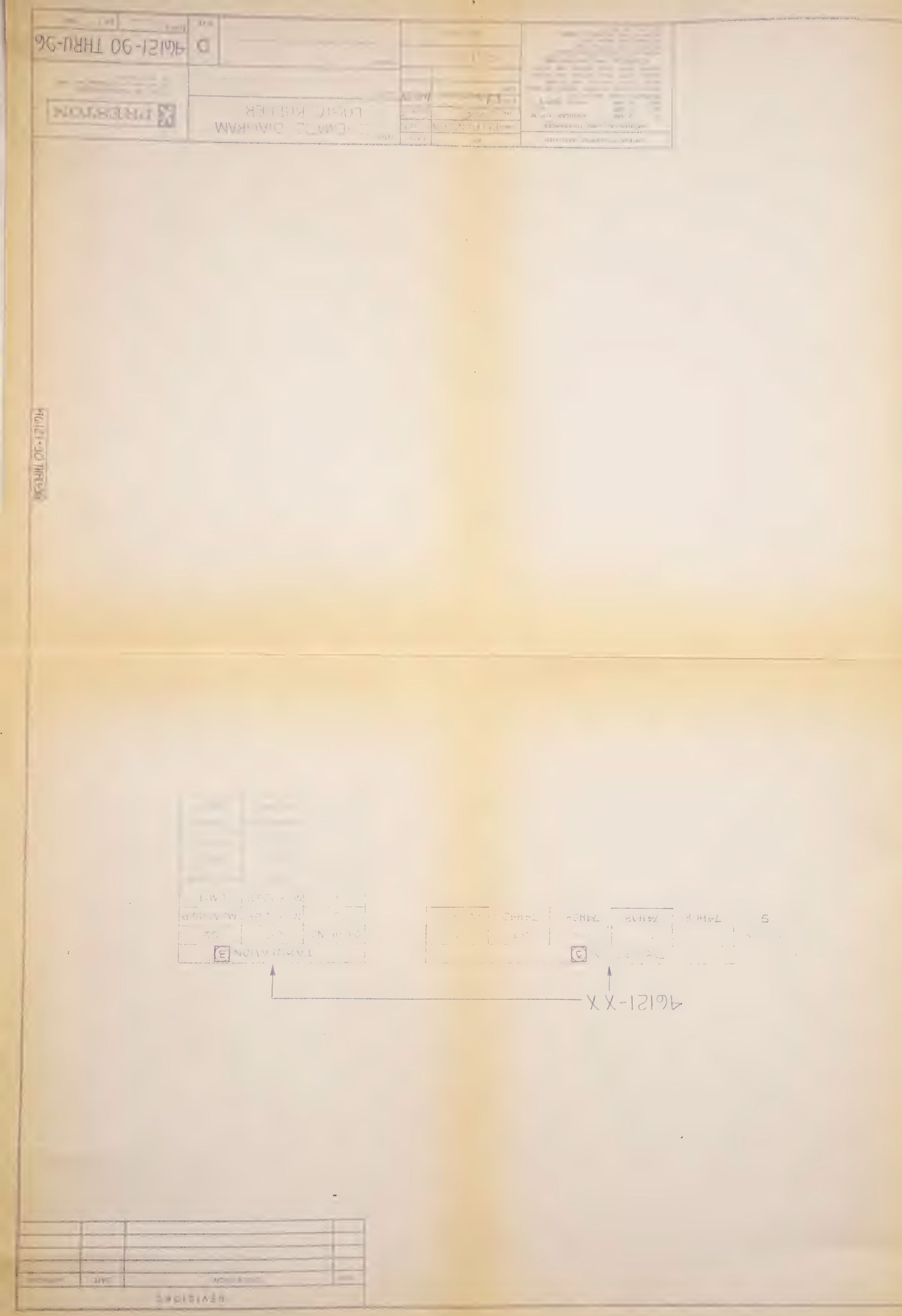


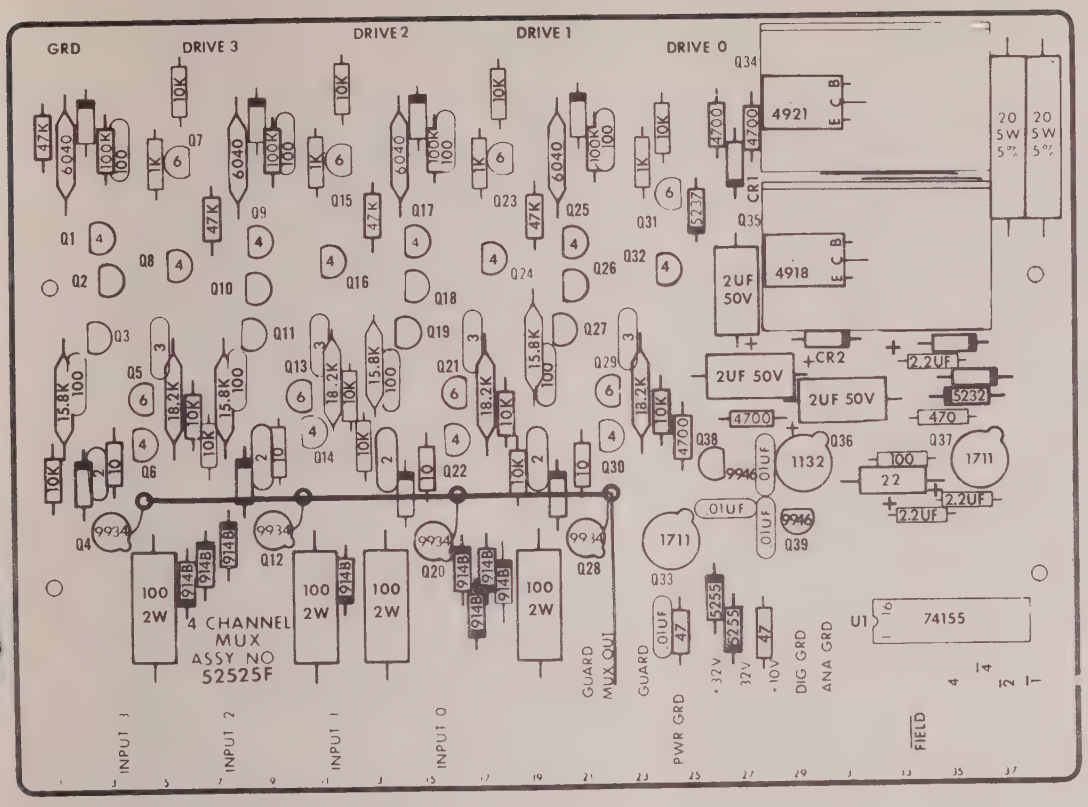
[5] TABULATION FILLED, NO ADDITIONAL TABULATION ALLOWED

[3] SEE TABULATION

1. ALL RESISTORS ARE 1/4W, 5%

NOTE: UNLESS OTHERWISE SPECIFIED


4G121-90 THRU-96
4G121-XX

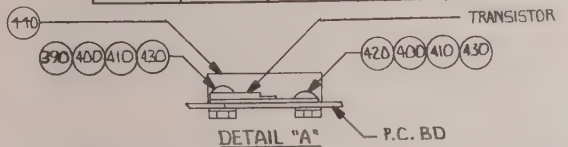


PRINTED CIRCUIT ASSY 4 CHANNEL MUX [7] F S

52525-T

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

TABULATION				
DASH NO.	FULL SCALE	CR1	CR2	V1
52525-00	± 10V	IN5241B	IN5241B	11.5
52525-01	±10.24V	IN5242B	IN5242B	12.5
52525-02	± 5.0V	IN5234B	IN5234B	6.8
52525-03	± 8.192V	IN5239B	IN5239B	9.7
52525-04	±12.5 V	IN5243B	IN5243B	13.5
52525-05	± 2.5V	IN5227B	IN5227B	4.2



[7] FOR CR1, CR2, FULL SCALE & V1 VALUES SEE TABULATION.
6. ALL TRANSISTORS ARE 9934.
5. FOR HEATSINK ASSY SEE DETAIL "A".
4. ALL CAPACITOR VALUES ARE IN PF.
3. ALL DIODES ARE IN4148.
2. FOR PARTS LIST SEE SH 3 OF 3.
1. FOR SCHEMATIC DIAGRAM SEE DWG NO. 52526-T.

NOTE : UNLESS OTHERWISE SPECIFIED.

BY	DATE
DRAWN [illegible]	12-28-72
CHK [illegible]	1-15-73
ENGR [illegible]	1-15-73
APPD	
APPD	

59830

NEXT ASSY

TITLE: PRINTED CIRCUIT ASSY 4 CHANNEL MUX [7] FULL SCALE

MATERIAL

FINISH

SCALE

A

52525-T

SH 2 OF 3

PRESTON SCIENTIFIC INCORPORATED
805 East Cerritos Ave., Anaheim, Calif. 92805
Tel. (714) 776-6400

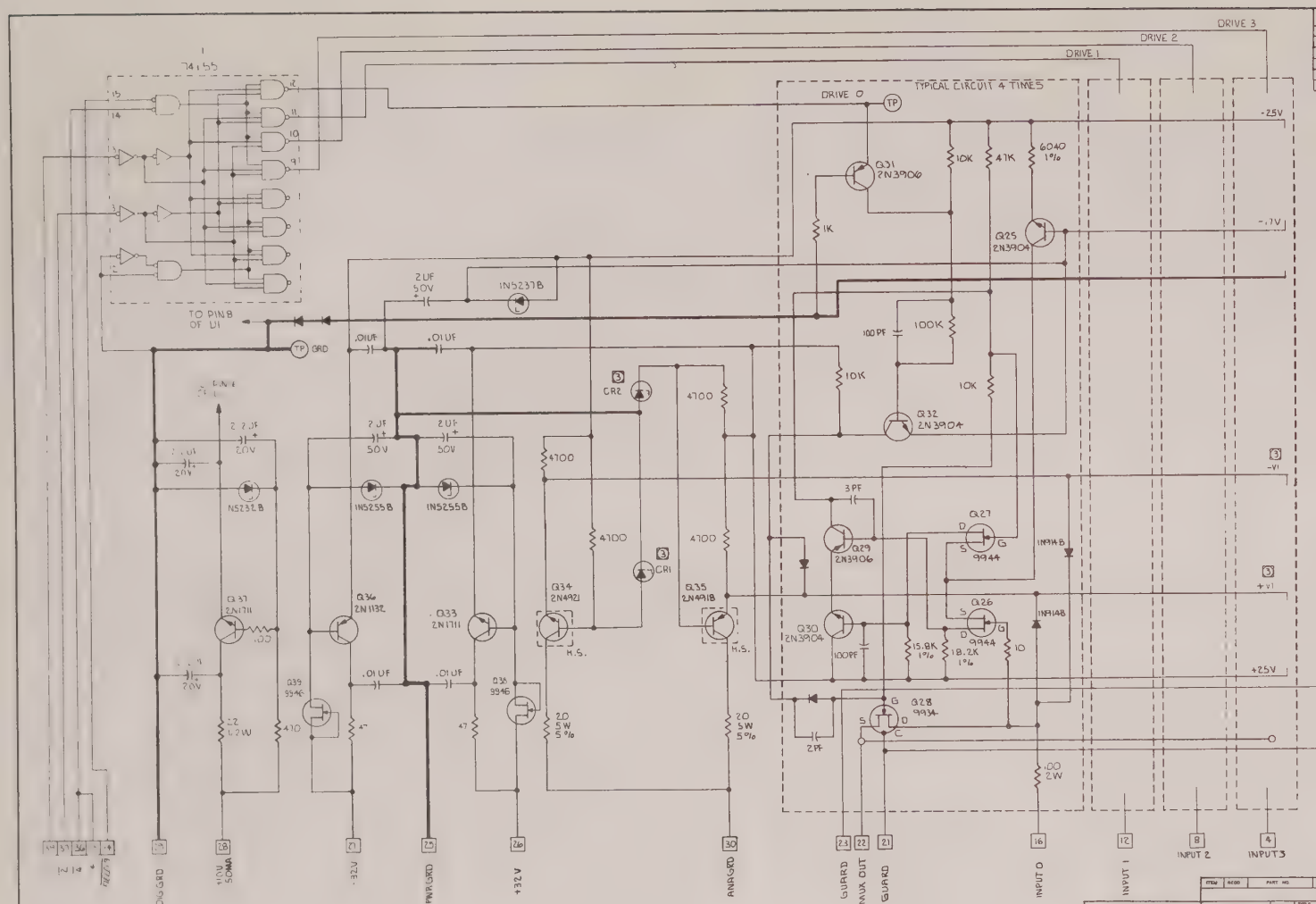
D1

TITLE: P.C. ASSY 4 CHANNEL MUX
DWG NO. 52525-00 REV A
SHEET 3 OF 3

PRESTON SCIENTIFIC INC.
PRINTED 2/21/75

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	52528-00	D&R ASSY 4 CHANNEL MUX	C
040	4	520-00	RESISTOR 1/4W 10% 10	
045	2	523-00	RESISTOR 1/4W 10% 47	
050	1	529-00	RESISTOR 1/4W 10% 470	
060	1	525-00	RESISTOR 1/4W 10% 100	
070	4	531-00	RESISTOR 1/4W 10% 1K	
090	4	536-00	RESISTOR 1/4W 10% 4700	
100	12	538-00	RESISTOR 1/4W 10% 10K	
120	4	544-00	RESISTOR 1/4W 10% 47K	
130	4	547-00	RESISTOR 1/4W 10% 100K	
140	4	448-00	RESISTOR 1/4W 1% 6040	
150	4	460-03	RESISTOR 1/4W 1% 15.8K	
160	4	463-00	RESISTOR 1/4W 1% 18.2K	
165	1	561-00	RESISTOR 1/2W 10% 22	
170	4	607-04	RESISTOR 2W 10% 100	
180	2	609-80	RESISTOR 5W 5% 20	
190	4	93-01	CAPACITOR 10% .01UF	
195	4	47-02	CAPACITOR - 2PF	
200	4	48-00	CAPACITOR 3PF	
220	8	61-01	CAPACITOR 10% 100PF	
230	3	116-00	CAPACITOR 2UF 50V	
235	3	131-00	CAPACITOR 20% 2.2UF 20V	
240	1	244-08	DIODE ZENER 1N5233B	
250	1	248-14	DIODE ZENER 1N5227B	
255	8	239-01	DIODE 1N914B	
260	2	248-13	DIODE ZENER 1N5241B	
270	2	247-20	DIODE ZENER 1N5255B	
280	10	239-00	DIODE 1N4148	
290	1	824-00	TRANSISTOR 2N1132	
300	2	928-00	TRANSISTOR 2N1711	
310	12	846-00	TRANSISTOR 2N3904	
320	8	846-01	TRANSISTOR 2N3906	
330	1	846-10	TRANSISTOR 2N4918	
340	1	846-03	TRANSISTOR 2N4921	
350	4	847-01	TRANSISTOR SELECTED 9934	
360	4	9944-00	TRANSISTOR SELECT PAIR	A
365	2	9946-00	TRANSISTOR SELECT	A
370	1	848-17	INTEGRATED CIRCUIT 74155	
390	2	666-00	SCREW PHMS 4-40 X 3/8	
400	6	855-00	WASHER FLAT #4 SM	
410	2	874-00	WASHER LOCK #4	
420	2	665-00	SCREW PHMS 4-40 X 5/16	
430	4	318-00	NUT 4-40	
440	2	51875-00	HEAT SINK	B
450	3	857-02	WASHER FLAT #4 FIBRE	



REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	E.O. 5091	3-21-73	[illegible]
B	E.O. 5176	9-12-73	[illegible]
C	E.O. 5192	10-1-73	B.H. [illegible]
D	E.O. 5199	10-22-73	B.H. [illegible]
E	E.O. 5456	2-20-75	B.H. [illegible]

TABULATION				
DASH NO.	F.S.	CR1	CR2	V1
52526-00	±10V	1N5241B	1N5241B	11.5
-01	±10.24V	1N5242B	1N5242B	2.5
-02	±5.0V	1N5234B	1N5234B	6.8
-03	±8.192V	1N5239B	1N5239B	3.7
-04	±12.5V	1N5243B	1N5243B	13.5
-05	±2.5V	1N5227B	1N5227B	4.2

3 SEE TABULATION.
2. ALL DIODES ARE 1N4148.
1. ALL RESISTORS ARE 1/4W 10%.
NOTE: UNLESS OTHERWISE SPECIFIED

ITEM	REQD	PART NO.	DESCRIPTION	VALUE	REFERENCE DESIGNATION

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED
MECHANICAL DWG TOLERANCES
X ±.010 ANGULAR ± 0° 30'
.XX ±.005 .XX ±.005
.XXX ±.005 MACH. SURF. 63
THREADS CLASS 3A OR 2B
REMOVE BURRS & SHARP EDGES .005 MAX.
MACH. FILLET RADIUS .005 MAX.
MACH. SURF. FLAT WITHIN .005 IN/IN
OTHER SURF. FLAT WITHIN .005 IN/IN
ELECTRICAL DWG DESIGNATIONS
REFERENCE DESIGNATIONS ARE ABBREVIATED PRIOR TO THE DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH

	BY	DATE
DRAWN	[illegible]	12-27-72
CHK	[illegible]	1-4-72
ENGR	[illegible]	2-15-72
APPD		
APPD		

TITLE SCHEMATIC DIAGRAM 4 CHANNEL MULTIPLEXER

PRESTON SCIENTIFIC INCORPORATED Anaheim Calif

MATERIAL

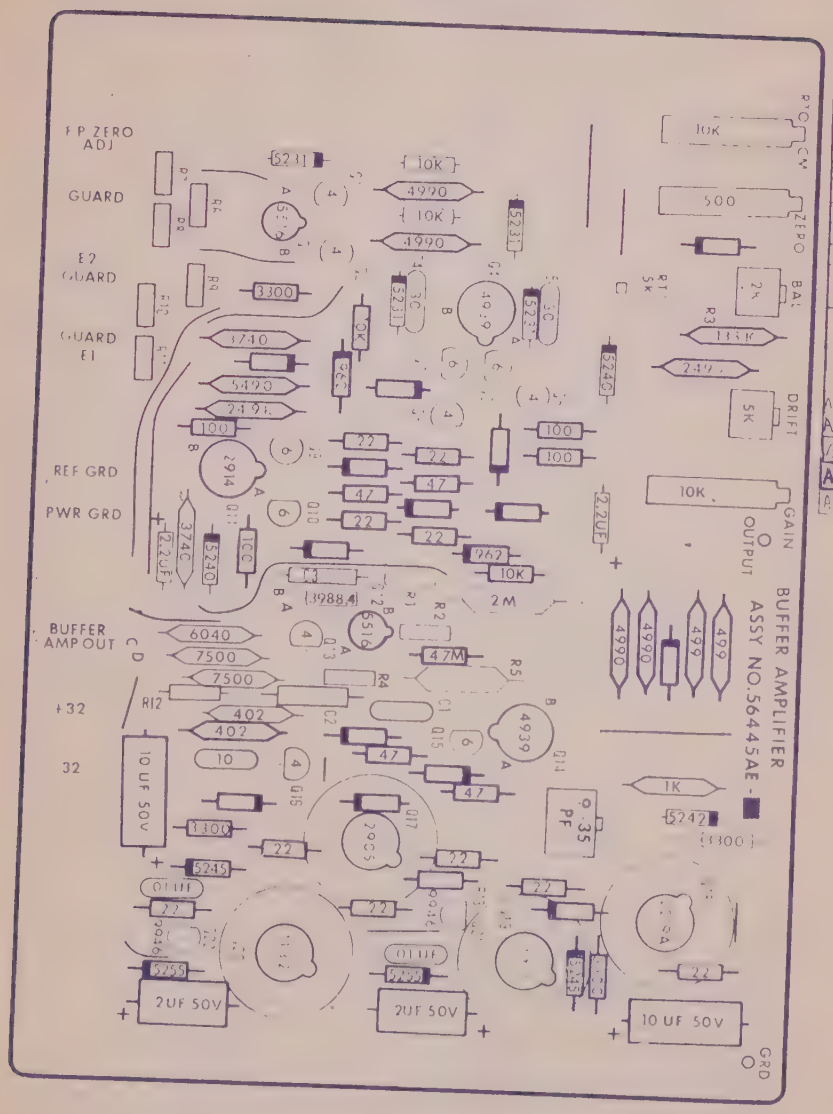
FINISH

SCALE — SIZE D CODE — SH 1 OF 1

52525-T NEXT ASSY

52526-T

REDUCE THIS LINE
TO 1.00



PRINTED CIRCUIT ASSY
BUFFER AMPLIFIER

FOR NOTES SEE SH 2

56445-T

TEST ASSY

[illegible]	[illegible]	C[illegible]		[illegible]	R[illegible]	[illegible]	[illegible]
[illegible]-00	5V.F.S.	3PF	5PF	OMIT	[illegible]	[illegible]	[illegible]
-01	10V.F.S.	3PF	5PF	OMIT	[illegible]		
-0[illegible]	10.24V.F.S.	3PF	[illegible]	OMIT	4044		
03	10V.F.S.	15PF	[illegible]	[illegible]	3988.4		
[illegible]	0-+5V.F.S.	3PF	5PF	5[illegible]	[illegible]		
[illegible]	[illegible]	[illegible]		OMIT	3267.3		
[illegible]	[illegible]	[illegible]		OMIT	65[illegible]2		
[illegible]	10V[illegible]	[illegible]		5PF	3988.4		
-08	[illegible]	3PF		OMIT	[illegible]	[illegible]	2M
-09	5V[illegible]				1993	3968.4	[illegible]
-10	[illegible]				4254.3	3992.4	
-11	[illegible]V.F.S.				3968.4		
-12	[illegible]				8168.24		
-13	[illegible]				2044		
-14	[illegible]				5982.6		
[illegible]-15	[illegible]	3PF	5PF	OMIT	3982.4	3992.4	[illegible]
[illegible]	[illegible]V.F.S.	3PF	5PF	OMIT	[illegible]	[illegible]	2M
[illegible]	[illegible]V.F.S.	3PF	5PF	OMIT	3988.4	3992.4	2M
[illegible]	[illegible]V.F.S.	3PF	5PF	OMIT	[illegible]	[illegible]	2M

[illegible] FOR -00 THRU -10 & -12 THRU -16, REPLACE R7 & R8 WITH A 1,410 OHM 1/4W 10% RESISTOR, TYP FOR R10 & R11.

7. R3, C4 & C5 ARE NOMINAL VALUE, SELECT IN TEST

[illegible]. FOR PARTS LIST SEE SHEET 4 & 5 OF 5.

[illegible]. FOR [illegible] VALUES SEE TABULATION, SH 2 & [illegible] OF 5.

[illegible] INSTALL HEATSINK (ITEM [illegible]) ON TRANSISTORS Q17-Q20 USING SILICONE GREASE (ITEM 540).

[illegible] FOR SCHEMATIC DIAGRAM SEE DWG NO. 564[illegible].

[illegible]. ALL DIODES ARE 1N4[illegible]

[illegible]. ALL CAPACITOR VALUES ARE IN PF.

[illegible]. UNLESS OTHERWISE SPECIFIED:

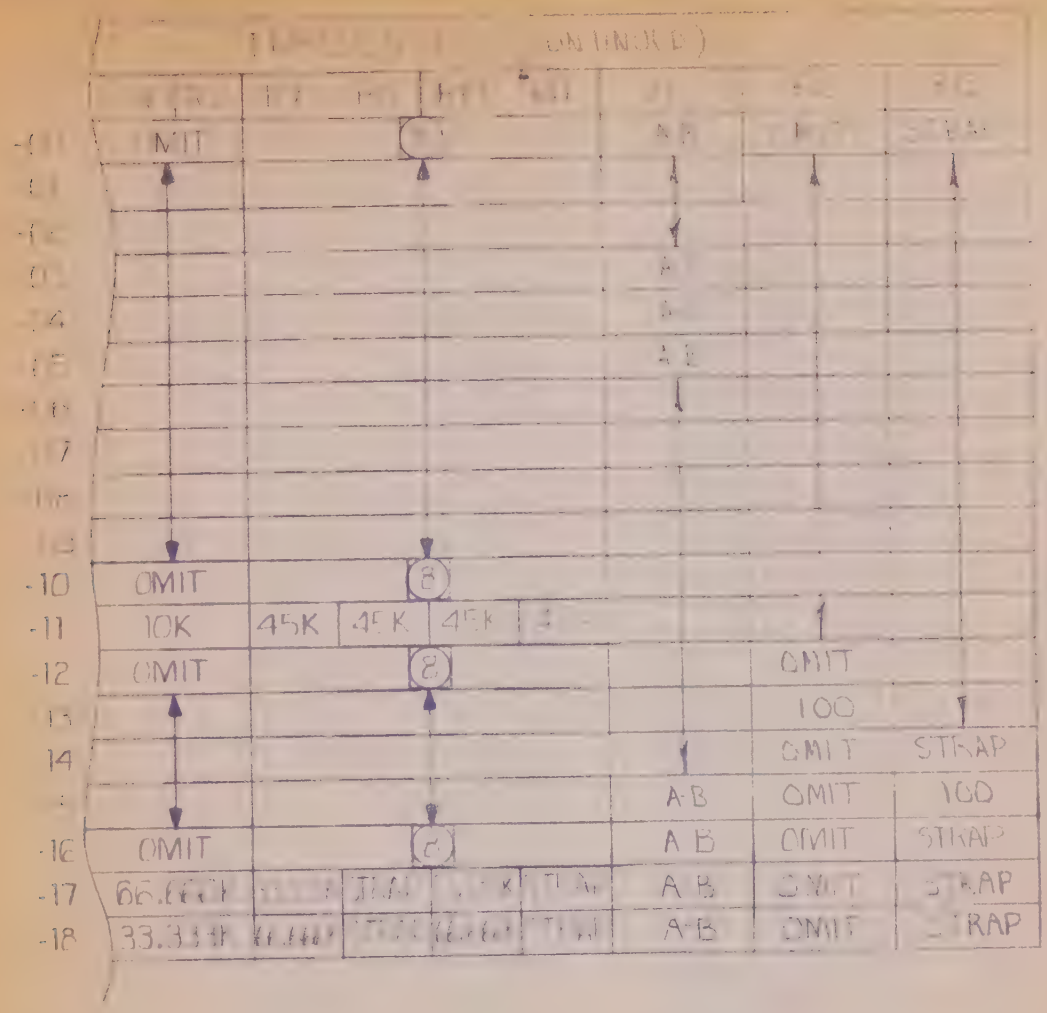
PRESTON SCIENTIFIC INCORPORATED Anaheim, Calif.

PRINTED CIRCUIT ASSY BUFFER AMPLIFIER

[illegible]

CODE [illegible] SH [illegible]

	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
-01	OMIT			8		A-B	OMIT	STRAP
-02								
-03						A-B		
-04						A-B		
-05						A-B		
-06								
-07								
-08								
-09								
-10	OMIT			8				
-11	10K	45K	45K	45K	[illegible]			
-12	OMIT			8			OMIT	
-13							100	
-14							OMIT	STRAP
-15						A-B	OMIT	100
-16	OMIT			8		A-B	OMIT	STRAP
-17	66.666K	[illegible]	STRAP	[illegible]	STRAP	A-B	OMIT	STRAP
-18	33.333K	[illegible]	STRAP	[illegible]	STRAP	A-B	OMIT	STRAP



PRESTON SCIENTIFIC INCORPORATED
Anaheim Calif

[illegible]
BUFFER AMPLIFIER

[illegible]

Code

SH [illegible] OF [illegible]

TITLE P.C. ASSY BUFFER AMPLIFIER — PRESTON SCIENTIFIC INC
DWG NO. 56445-15 REV A — PRINTED 08/12/76
SHEET 4 OF 5

PARTS LIST

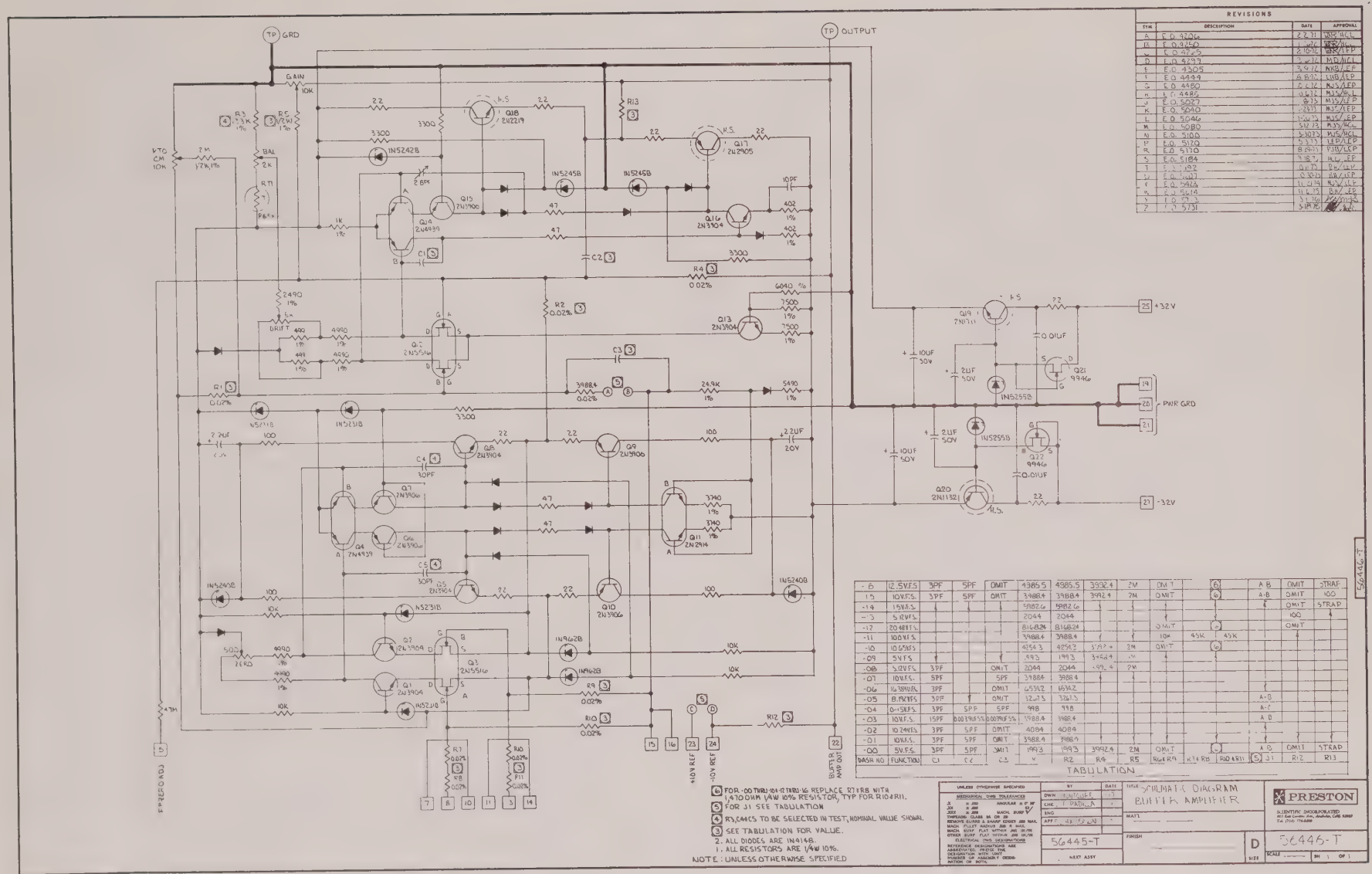
ITEM	QTY	PART NO.	DESCRIPTION	
10	1	56448-00	D&R ASSY BUFFER AMPLIFIER	C
20	10	521-00	RESISTOR 1/4W 10%	22
30	4	523-00	RESISTOR 1/4W 10%	47
40	5	525-00	RESISTOR 1/4W 10%	100
50	2	529-00	RESISTOR 1/4W 10%	470
70	4	535-00	RESISTOR 1/4W 10%	3300
80	4	538-00	RESISTOR 1/4W 10%	10K
90	1	555-00	RESISTOR 1/4W 10%	4.7M
100	2	401-04	RESISTOR 1/4W 1%	402
110	2	402-02	RESISTOR 1/4W 1%	499
120	1	409-00	RESISTOR 1/4W 1%	1K
130	1	427-00	RESISTOR 1/4W 1%	2490
140	2	439-01	RESISTOR 1/4W 1%	3740
150	4	445-00	RESISTOR 1/4W 1%	4990
160	1	446-00	RESISTOR 1/4W 1%	5490
170	1	448-00	RESISTOR 1/4W 1%	6040
180	2	451-06	RESISTOR 1/4W 1%	7500
190	1	467-03	RESISTOR 1/4W 1%	24.9K
210	1	478-16	RESISTOR 1/4W 1%	133K
220	2	488-11	RESISTOR 1/2W 1%	2M
240	3	998-25	RESISTOR .02%	3988.4
250	1	998-30	RESISTOR .02%	3992.4
255	1	374-02	THERMISTOR	5K
260	1	344-07	POTENTIOMETER	500
270	1	346-80	POTENTIOMETER	2K
280	1	351-80	POTENTIOMETER	5K
290	2	359-03	POTENTIOMETER	10K
300	1	48-00	CAPACITOR	3PF
310	1	50-01	CAPACITOR	5PF
320	1	52-01	CAPACITOR 5%	10PF
325	2	56-01	CAPACITOR 5%	30PF
330	1	77-01	CAPACITOR TRIMMER	9-35PF
340	2	93-01	CAPACITOR 10%	.01UF
350	2	116-00	CAPACITOR	2UF 50V
360	2	131-00	CAPACITOR 20%	2.2UF 20V
370	2	142-01	CAPACITOR	10UF 50V
380	14	239-00	DIODE	1N4148
385	2	240-80	DIODE ZENER	1N962B
390	4	248-06	DIODE ZENER	1N5231B
400	2	248-10	DIODE ZENER	1N5240B
410	1	237-00	DIODE ZENER	1N5242B
420	2	248-12	DIODE ZENER	1N5245B
430	2	247-20	DIODE ZENER	1N5255B
440	1	824-00	TRANSISTOR	2N1132
450	1	828-00	TRANSISTOR	2N1711
460	1	830-02	TRANSISTOR	2N2219A
470	1	838-02	TRANSISTOR	2N2905A
480	1	838-04	TRANSISTOR	2N2914
490	6	846-00	TRANSISTOR	2N3904
500	5	846-01	TRANSISTOR	2N3906

TITLE: P C. ASSY BUFFER AMPLIFIER
DWG NO 56445-15 REV
SHEET . . OF. .

PRESTON SCIENTIFIC INC
PRINTED 08/12/7A

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION		
510	2	846-08	TRANSISTOR	2N4939	
520	2	847-12	TRANSISTOR	2N5516	
525	2	9946-00	TRANSISTOR SELECT		A
530	4	284-01	HEAT SINK		
540	A/R	904-00	SILICONE GREASE		
550	A/R	994-11	WIRE 22 AWG		



REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	E.O. 3206	2.2.71	WB/MCL
B	E.O. 3250	4.1.71	WB/MCL
C	E.O. 4225	8.10.72	WB/LEP
D	E.O. 4297	2.2.72	MD/MCL
E	E.O. 4305	3.9.72	WB/LEP
F	E.O. 4449	8.8.72	WB/LEP
G	E.O. 4480	9.26.72	MJS/LEP
H	E.O. 4985	11.6.72	MJS/MCL
J	E.O. 5027	2.15	MJS/LEP
K	E.O. 5040	3.23.73	MJS/LEP
L	E.O. 5046	4.24.73	MJS/LEP
M	E.O. 5080	5.17.73	MJS/MCL
N	E.O. 5100	5.30.73	MJS/MCL
P	E.O. 5170	8.3.73	LEP/LEP
R	E.O. 5110	8.20.73	PJD/LEP
S	E.O. 5184	9.18.73	MJS/LEP
T	E.O. 192	9.11.73	DR/LEP
U	E.O. (illegible)	9.20.73	DR/LEP
V	E.O. 5424	11.2.73	MJS/LEP
W	E.O. 5414	11.6.73	DR/LEP
X	E.O. 5473	3.1.74	DR/LEP
Z	E.O. 5731	5.28.76	MJS/MCL

-B	12.5V F.S.	3PF	5PF	OMIT	4985.5	4985.5	3992.4	2M	OMIT		6	A B	OMIT	STRAP
-13	10V F.S.	3PF	5PF	OMIT	3988.4	3988.4	3992.4	2M	OMIT		6	A-B	OMIT	100
-14	15V F.S.				5982.6	5982.6						6	OMIT	STRAP
-13	5.12V F.S.				2044	2044							100	
-12	20.48V F.S.				8168.24	8168.24			OMIT	6			OMIT	
-11	100V F.S.				3988.4	3988.4			10K	45K	45K			
-10	10.05V F.S.				4254.3	4254.3	3992.4	2M	OMIT	6				
-09	5V F.S.				1993	1993	3992.4	2M						
-08	5.12V F.S.	3PF		OMIT	2044	2044	1993.4	2M						
-07	10V F.S.	5PF		5PF	3988.4	3988.4						A-B		
-06	14.33V F.S.	3PF		OMIT	6532	6532								
-05	8.192V F.S.	3PF		OMIT	3273	3273						A-B		
-04	0-1 SER F.S.	3PF	5PF	5PF	998	998						A-C		
-03	10V F.S.	15PF	0.003900 5%	0.0078UF 5%	1988.4	1988.4						A-D		
-02	10.24V F.S.	3PF	5PF	OMIT	4084	4084								
-01	10V F.S.	3PF	5PF	OMIT	3988.4	3988.4						A-B	OMIT	STRAP
-00	5V F.S.	3PF	5PF	OMIT	1993	1993	3992.4	2M	OMIT	6				
DASH NO	FUNCTION	C1	C2	C3	Y	R2	R4	R5	R6 & R9	R7 & R8	R10 & R11	J1	R12	R13

TABULATION

6. FOR -00 THRU -10 & -12 THRU -16 REPLACE R7 & R8 WITH 1,470 OHM 1/4W 10% RESISTOR, TYP FOR R10 & R11.
5. FOR J1 SEE TABULATION
4. R'S & C'S TO BE SELECTED IN TEST, NOMINAL VALUE SHOWN.
3. SEE TABULATION FOR VALUE.
2. ALL DIODES ARE IN4148.
1. ALL RESISTORS ARE 1/4W 10%.

NOTE: UNLESS OTHERWISE SPECIFIED

UNLESS OTHERWISE SPECIFIED
MECHANICAL DWG TOLERANCES
.X ± .050 ANGULAR ± 0° 30'
.XX ± .020 125
.XXX ± .005 MACH. SURF
TAPERING CLASS 3A OR 2B
REMOVE BURRS & SHARP EDGES .005 MAX.
MACH. SURF. FLAT WITHIN .005 IN/IN
ETCH. SURF. FLAT WITHIN .005 IN/IN
OTHER SURF. FLAT WITHIN .010 IN/IN
ELECTRICAL DWG DESIGNATIONS
REFERENCE DESIGNATIONS ARE ABBREVIATED PREFIX TYPE DESIGNATION WITH UNIT NUMBER FOLLOWED BY DESIGNATION OF ASSEMBLY

	BY	DATE
DWN	MANTOVELLI	
CHK	T. PARKER	
ENG		
APPR	R. EVANS	

56445-T
NEXT ASSY

TITLE SCHEMATIC DIAGRAM
BUFFER AMPLIFIER

MATL

FINISH

PRESTON
SCIENTIFIC INCORPORATED
357 East Center Ave., Anaheim, Calif. 92802
Tel. (714) 774-4400

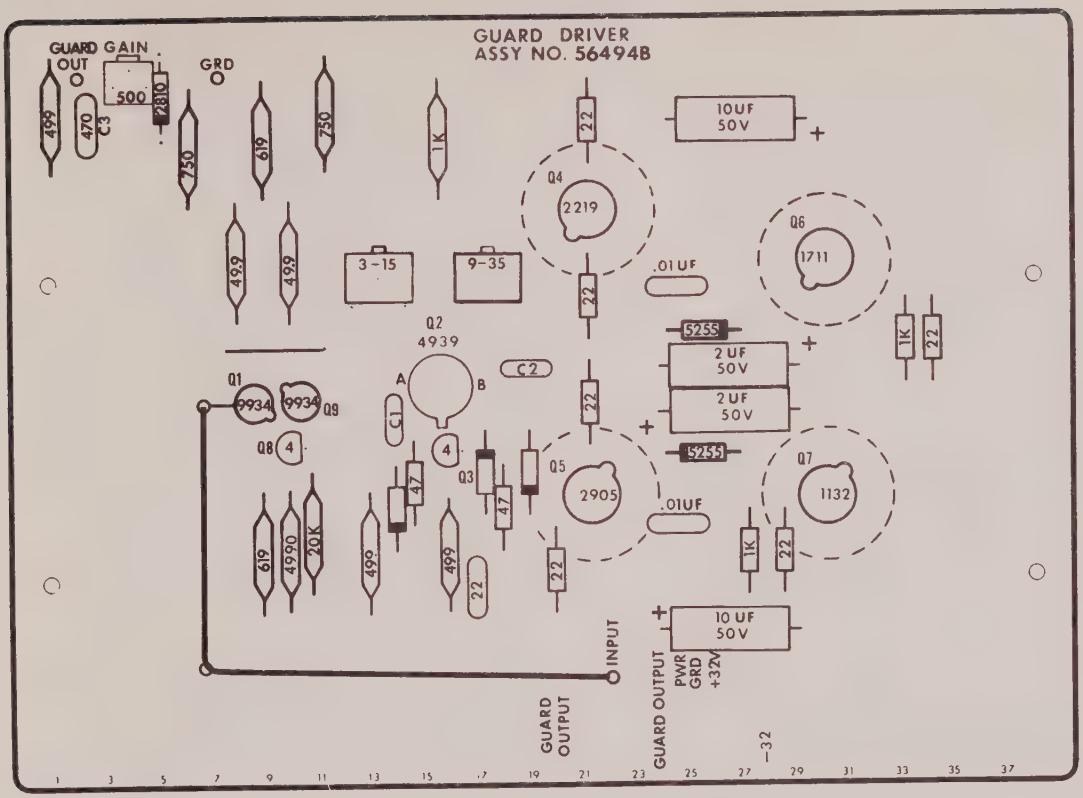
D
SIZE

56445-T

SCALE

SH 1 OF 1

56446-T



TITLE	PRINTED CIRCUIT ASSY GUARD DRIVER	PRESTON SCIENTIFIC INCORPORATED Anaheim, Calif.	
MATERIAL			
FINISH		SIZE	56494
SCALE 2/1		CODE	SH 1 OF 3
BY	DATE		
DRAWN M. J. STEM	10-12-72		
CHK	10-13-72		
ENGR	10-19-72		
APPD			
APPD			
ABBREVIATIONS PER MIL-STD-12			

56494

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

8. C3 NOMINAL VALUE SHOWN CORRECT VALUE SELECTED IN TEST.
7. C1 & C2 TO BE SELECTED IN TEST.
6. FOR L/M SEE SHEET 3 OF 3.
5. TIE GATE LEAD OF Q9 TO BIFURCATED TERMINAL.
4. INSTALL HEAT SINK (ITEM 290) ON TRANSISTORS Q4, Q5, Q6 & Q7 USING SILICONE GREASE (ITEM 280).
3. FOR SCHEMATIC DIAGRAM SEE DWG 56495.
2. ALL DIODES ARE 1N4148.
1. ALL CAPACITORS ARE IN PF.

NOTES UNLESS OTHERWISE SPECIFIED

BY	DATE	TITLE PRINTED CIRCUIT ASSY GUARD DRIVER	PRESTON SCIENTIFIC INCORPORATED
DRAWN M. J. STEM	10-12-72		
CHK	10-13-72		
ENGR	10-19-72	MATERIAL	
APPD			
APPD			
59175		FINISH	A
NEXT ASSY		SCALE	SIZE
		CODE	SH 2 OF 3

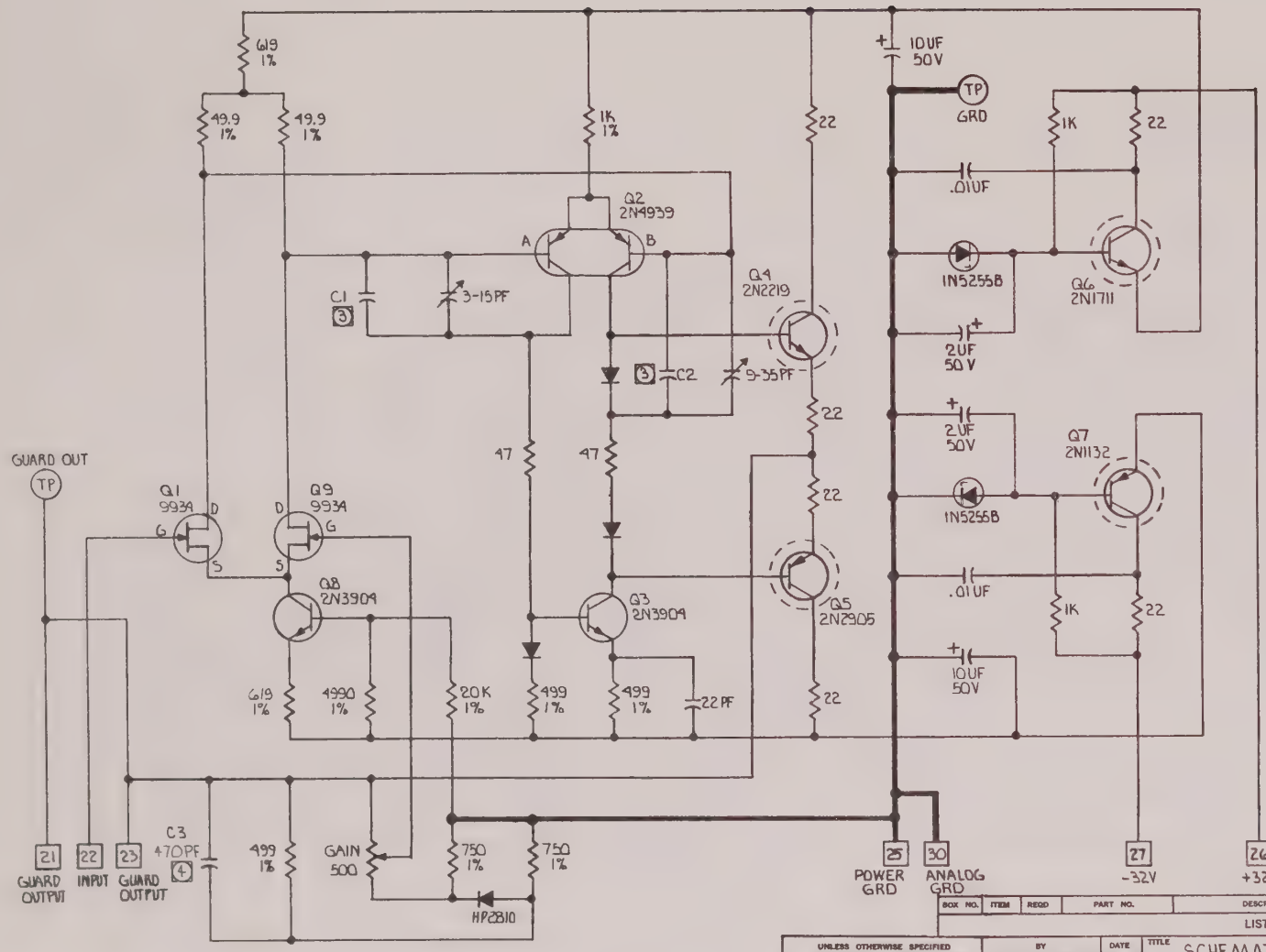
TITLE: P.C. ASSY GUARD DRIVER
DWG NO. 56494-00 REV _____
SHEET 3 OF 3

PRESTON SCIENTIFIC INC.
PRINTED 10/13/72

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	56497-00	DRILL & RIVET ASSY	
040	6	521-00	RESISTOR 1/4W 10%	22
050	2	523-00	RESISTOR 1/4W 10%	47
060	2	531-00	RESISTOR 1/4W 10%	1K
080	2	394-12	RESISTOR 1/4W 1%	49.9
090	3	402-02	RESISTOR 1/4W 1%	499
095	2	405-01	RESISTOR 1/4W 1%	619
100	2	407-00	RESISTOR 1/4W 1%	750
110	1	409-00	RESISTOR 1/4W 1%	1K
115	1	445-00	RESISTOR 1/4W 1%	4990
120	1	465-02	RESISTOR 1/4W 1%	20K
125	1	344-80	POTENTIOMETER	500
140	1	55-01	CAPACITOR	22PF
145	1	78-01	CAPACITOR	3-15PF
150	1	77-01	CAPACITOR	9-35PF
155	1	72-01	CAPACITOR	470PF
160	2	93-01	CAPACITOR	.01UF
170	2	116-00	CAPACITOR	2UF 50V
180	2	142-01	CAPACITOR	10UF 50V
185	1	248-22	DIODE	HP2810
190	3	239-00	DIODE	1N4148
200	2	247-20	DIODE	1N5255B
210	1	828-00	TRANSISTOR	2N1711
220	1	824-00	TRANSISTOR	2N1132
230	1	830-01	TRANSISTOR	2N2219
240	1	838-02	TRANSISTOR	2N2905
250	2	846-00	TRANSISTOR	2N3904
260	1	846-08	TRANSISTOR	2N4939
270	2	847-01	TRANSISTOR SELECT	9934
280	A/R	904-00	SILICONE GREASE	
290	4	284-01	HEATSINK	

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	E.O. 4495	10-24-72	
B	E.O. 5394	10-3-74	



4 C3 NOMINAL VALUE SHOWN, CORRECT VALUE SELECTED IN TEST.

3 C1 & C2 TO BE SELECTED IN TEST.

2. ALL DIODES ARE IN4148.

1. ALL RESISTORS ARE 1/4W, 10%.

NOTES: UNLESS OTHERWISE SPECIFIED

BOX NO.	ITEM	REQD	PART NO.	DESCRIPTION	VALUE	REFERENCE DESIGNATION

LIST OF MATERIALS

UNLESS OTHERWISE SPECIFIED

MECHANICAL DWG TOLERANCES

X ± .050 ANGULAR ± 0° 30'
XX ± .020 63
XXX ± .005 MACH. SURF.
THREADS: CLASS 3A OR 2B
REMOVE BURRS & SHARP EDGES .020 MAX.
MACH. FILLET RADIUS .020 R MAX.
MACH. SURF. FLAT WITHIN .001 IN/IN
OTHER SURF. FLAT WITHIN .005 IN/IN

ELECTRICAL DWG DESIGNATIONS

REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.

ABBREVIATIONS PER MIL-STD-12

	BY	DATE
DRAWN	M. J. STEM	10-13-72
CHK		10-13-72
ENGR		10-18-72
APPD		
APPD		

TITLE: SCHEMATIC DIAGRAM GUARD DRIVER

PRESTON SCIENTIFIC INCORPORATED Anaheim, Calif.

MATERIAL

FINISH

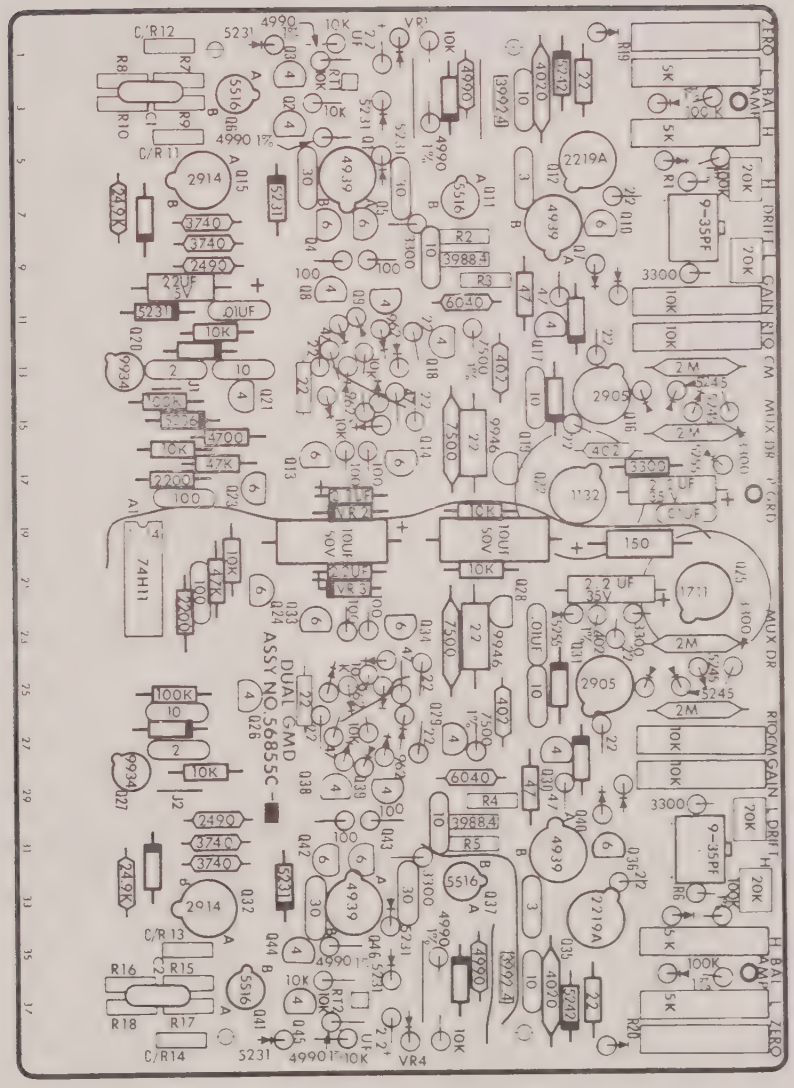
SCALE

C SIZE

56495 CODE

SH | OF |

56494 NEXT ASSY



	PRINTED CIRCUIT ASSY DUAL GMD	PRESTON	
	MATERIAL		
	FINISH	56855-T	58150
ABBREVIATIONS PER MIL STD 12	SCALE 2/1	SIZE	NEXT ASSY

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHEET ONE		

13. FOR -02 THRU -05, REPLACE R7 & R8 WITH 1 (ONE) 470 OHM, 10% RESISTOR. TYP FOR R9 & R10, R15 & R16, AND R17 & R18.
12. MOUNT Q12, Q16, Q22, Q25, Q31 AND Q35 USING TRANSISTOR PAD (ITEM 435).
11. MOUNT Q1, Q7, Q15, Q32, Q40 AND Q46 USING TRANSISTOR PAD (ITEM 432).
10. INSTALL WIRE (ITEM 550) IN HOLES WITH CIRCUITRY ON COMPONENT SIDE AND SOLDER BOTH SIDES WHERE APPLICABLE.
9. INSTALL HEATSINK (ITEM 530) ON TRANSISTORS Q22 & Q25 USING SILICONE GREASE (ITEM 540).
8. J1 & J2 TO BE SELECTED IN TEST.
7. R1 & R6 ARE TO BE SELECTED IN TEST, NOMINAL VALUE 20K, 1%.
6. FOR R2-R5, R7-R10, R15-R20, C/R11-C/R14, VR1-VR4, C1 & C2 SEE TABULATION SHEET 3 OF 5.
5. ALL CAPACITOR VALUES ARE IN PF.
4. ALL DIODES ARE IN4148.
3. ALL RESISTORS ARE 1/4W, 10%.
2. FOR PARTS LIST SEE SHEET 4 & 5 OF 5.
1. FOR SCHEMATIC DIAGRAM SEE DWG. NO. 56856-T.

NOTE: UNLESS OTHERWISE SPECIFIED.

BY	DATE
DWN H.C. LOTZE	2-13-74
CHK M.J STEM	2-13-74
ENG D.L. SYMONS	2-13-74
APP	

TITLE: PRINTED CIRCUIT ASSY DUAL GMD

MAT'L

FINISH

58150 NEXT ASSY

A SIZE

56855-T

SCALE — SH 2 OF 5

PRESTON
SCIENTIFIC INCORPORATED
805 East Cerritos Ave., Anaheim, Calif. 92805
Tel (714) 776-6400

TABULATION				
DASH NO.	FUNCTION	C1 & C2	R2 & R5	R3 & R4
56855-00	50V.F.S.(.2)	OMIT	1993	1993
56855-01	100V.F.S (.1)	OMIT	3988.4	3988.4
56855-02	5V.F.S. (2)	OMIT	1993	1933
56855-03	10V.F.S.(1)	OMIT	3988.4	3988.4
56855-04	10V.F.S.(1)	0.01UF	3988.4	3988.4
56855-05	1.024 V.F.S. (10)	OMIT	398.84	398.84
56855-06	20.48 V.F.S.(.5)	OMIT	3988.4	3988.4
56855-07	40.96 V.F.S.(.25)	OMIT	3988.4	3988.4
56855-08	81.92 V.F.S.(.125)	OMIT	3988.4	3988.4
56855-09	13.653 V.F.S. .15	OMIT	3988.4	3988.4

TABULATION					
	R7, R9, R15, & R17	R8, R10, R16, & R18	C/R11 THRU C/R14	VR1 THRU VR4	R19 & R20
-00	45K, 0.02%	45K, 0.02%	10K	IN5240B	500
-01	45K, 0.02%	45K, 0.02%	10K	IN5240B	500
-02	(13) 470, 10%		22PF	IN5240B	500
-03	(13) 470, 10%		22PF	IN5240B	500
-04	(13) 470, 10%		22M, 1/4W, 10%	IN5240B	500
-05	(13) 470, 10%		22PF	IN5240B	100
-06	STRAP	50K	50K	IN5241B	500
-07	25K	50K	25K	IN5241B	500
-08	37.5K	50K	12.5K	IN5241B	500
-09	STRAP	25K	7.5K	IN5241B	500

PRESTON SCIENTIFIC INCORPORATED Anaheim, Calif.

PRINTED CIRCUIT ASSY DUAL GMD

56855-T

CODE — SH 3 OF 5

TITLE: P.C. ASSY DUAL GMD (10)
DWG NO. 56855-05 REV ..P...
SHEET. 4. OF. 5.

PRESTON SCIENTIFIC INC.
PRINTED 01/04/77

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION		
10	1	56858-00	D&R ASSY DUAL GMD		C
20	16	521-00	RESISTOR 1/4W 10%	22	
30	8	523-00	RESISTOR 1/4W 10%	47	
40	8	525-00	RESISTOR 1/4W 10%	100	
50	4	529-00	RESISTOR 1/4W 10%	470	
65	2	533-00	RESISTOR 1/4W 10%	2200	
70	8	535-00	RESISTOR 1/4W 10%	3300	
75	1	536-00	RESISTOR 1/4W 10%	4700	
80	16	538-00	RESISTOR 1/4W 10%	10K	
95	2	544-00	RESISTOR 1/4W 10%	47K	
98	2	547-00	RESISTOR 1/4W 10%	100K	
100	4	386-03	RESISTOR 1/8W 1%	402	
130	2	387-07	RESISTOR 1/8W 1%	2490	
140	4	388-02	RESISTOR 1/8W 1%	3740	
150	8	389-01	RESISTOR 1/8W 1%	4990	
170	2	390-03	RESISTOR 1/8W 1%	6040	
180	2	390-04	RESISTOR 1/8W 1%	7500	
185	2	392-00	RESISTOR 1/8W 1%	20K	
190	2	392-01	RESISTOR 1/8W 1%	24.9K	
200	4	393-05	RESISTOR 1/8W 1%	100K	
210	4	488-20	RESISTOR 1/8W 1%	2M	
212	2	440-00	RESISTOR 1/4W 1%	4020	
218	2	451-06	RESISTOR 1/4W 1%	7500	
225	2	561-00	RESISTOR 1/2W 10%	22	
228	1	566-00	RESISTOR 1/2W 10%	150	
230	4	999-24	RESISTOR .02%	398.84	
240	2	998-25	RESISTOR .02%	3988.4	
250	2	998-30	RESISTOR .02%	3992.4	
255	2	374-05	THERMISTOR	10K	
260	2	342-01	POTENTIOMETER	100	
270	4	352-01	POTENTIOMETER	5K	
280	2	351-80	POTENTIOMETER	5K	
285	4	359-03	POTENTIOMETER	10K	
290	4	360-03	POTENTIOMETER	20K	
295	2	47-02	CAPACITOR	2PF	
300	2	48-00	CAPACITOR	3PF	
320	8	52-01	CAPACITOR 5%	10PF	
322	4	55-01	CAPACITOR 5%	22PF	
325	4	56-01	CAPACITOR 5%	30PF	
326	2	61-01	CAPACITOR 10%	100PF	
330	2	77-01	CAPACITOR TRIMMER	9-35PF	
340	3	93-01	CAPACITOR 10%	.01UF	
360	4	131-00	CAPACITOR 20%	2.2UF 20V	
365	2	133-00	CAPACITOR 20%	2.2UF 35V	
370	2	142-01	CAPACITOR	10UF 50V	
375	1	144-00	CAPACITOR 20%	22UF 15V	
380	34	239-00	DIODE	1N4148	
385	4	240-80	DIODE ZENER	1N962B	
390	9	248-06	DIODE ZENER	1N5231B	
395	1	248-07	DIODE ZENER	1N5236B	

TITLE: P.C. ASSY DUAL GMD (10)
DWG NO. 56855-05 REV ..P...
SHEET. 5. OF. 5.

PRESTON SCIENTIFIC INC.
PRINTED 01/04/77

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION		
400	4	248-10	DIODE ZENER	1N5240B	
410	2	237-00	DIODE ZENER	1N5242B	
420	4	248-12	DIODE ZENER	1N5243B	
430	2	247-20	DIODE ZENER	1N5255B	
432	6	327-00	TRANSISTOR PAD		
435	6	326-00	TRANSISTOR PAD		
440	1	824-00	TRANSISTOR	2N1132	
450	1	828-00	TRANSISTOR	2N1711	
460	2	830-02	TRANSISTOR	2N2219A	
470	2	838-02	TRANSISTOR	2N2905A	
480	2	838-04	TRANSISTOR	2N2914	
490	14	846-00	TRANSISTOR	2N3904	
500	12	846-01	TRANSISTOR	2N3906	
510	4	846-08	TRANSISTOR	2N4939	
520	4	847-12	TRANSISTOR	2N5516	
525	2	847-01	TRANSISTOR SELECTED	9934	
528	2	9946-00	TRANSISTOR SELECT		A
530	2	284-01	HEAT SINK		
535	1	848-28	INTEGRATED CIRCUIT	74H11	
540	A/R	904-00	SILICONE GREASE		
550	A/R	989-00	WIRE 22 AWG		

TITLE: P.C. ASSY DUAL QMD (.5)
DWG NO. 56855-06 REV ..D...
SHEET..4.OF.5.

PRESTON SCIENTIFIC INC.
PRINTED 01/04/77

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
10	1	56858-00	D&R ASSY DUAL QMD	C
20	16	521-00	RESISTOR 1/4W 10% 22	
30	8	523-00	RESISTOR 1/4W 10% 47	
40	8	525-00	RESISTOR 1/4W 10% 100	
65	2	533-00	RESISTOR 1/4W 10% 2200	
70	8	535-00	RESISTOR 1/4W 10% 3300	
75	1	536-00	RESISTOR 1/4W 10% 4700	
80	16	538-00	RESISTOR 1/4W 10% 10K	
95	2	544-00	RESISTOR 1/4W 10% 47K	
98	2	547-00	RESISTOR 1/4W 10% 100K	
100	4	386-03	RESISTOR 1/8W 1% 402	
130	2	387-07	RESISTOR 1/8W 1% 2490	
140	4	388-02	RESISTOR 1/8W 1% 3740	
150	8	389-01	RESISTOR 1/8W 1% 4990	
170	2	390-03	RESISTOR 1/8W 1% 6040	
180	2	390-04	RESISTOR 1/8W 1% 7500	
185	2	392-00	RESISTOR 1/8W 1% 20K	
190	2	392-01	RESISTOR 1/8W 1% 24.9K	
200	4	393-05	RESISTOR 1/8W 1% 100K	
210	4	488-20	RESISTOR 1/8W 1% 2M	
212	2	440-00	RESISTOR 1/4W 1% 4020	
218	2	451-06	RESISTOR 1/4W 1% 7500	
225	2	561-00	RESISTOR 1/2W 10% 22	
228	1	566-00	RESISTOR 1/2W 10% 150	
230	6	998-25	RESISTOR .02% 3988.4	
235	2	998-30	RESISTOR .02% 3992.4	
250	8	999-87	RESISTOR .02% 50K	
255	2	374-05	THERMISTOR 10K	
260	2	344-07	POTENTIOMETER 500	
270	4	352-01	POTENTIOMETER 5K	
280	2	351-80	POTENTIOMETER 5K	
285	4	359-03	POTENTIOMETER 10K	
290	4	360-03	POTENTIOMETER 20K	
295	2	47-02	CAPACITOR 2PF	
300	2	48-00	CAPACITOR 3PF	
320	8	52-01	CAPACITOR 5% 10PF	
325	4	56-01	CAPACITOR 5% 30PF	
326	2	61-01	CAPACITOR 10% 100PF	
330	2	77-01	CAPACITOR TRIMMER 9-35PF	
340	3	93-01	CAPACITOR 10% .01UF	
360	4	131-00	CAPACITOR 20% 2.2UF 20V	
365	2	133-00	CAPACITOR 20% 2.2UF 35V	
370	2	142-01	CAPACITOR 10UF 50V	
375	1	144-00	CAPACITOR 20% 22UF 15V	
380	34	239-00	DIODE 1N4148	
385	4	240-80	DIODE ZENER 1N962B	
390	9	248-06	DIODE ZENER 1N5231B	
395	1	248-07	DIODE ZENER 1N5236B	
400	4	248-13	DIODE ZENER 1N5241B	
410	2	237-00	DIODE ZENER 1N5242B	

TITLE: P.C. ASSY DUAL QMD (.5)
DWG NO. 56855-06 REV ..D...
SHEET..5.OF.5.

PRESTON SCIENTIFIC INC.
PRINTED 01/04/77

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
420	4	248-12	DIODE ZENER	1N5245B
430	2	247-20	DIODE ZENER	1N5255B
432	6	327-00	TRANSISTOR PAD	
435	6	326-00	TRANSISTOR PAD	
440	1	824-00	TRANSISTOR	2N1132
450	1	828-00	TRANSISTOR	2N1711
460	2	830-02	TRANSISTOR	2N2219A
470	2	838-02	TRANSISTOR	2N2905A
480	2	838-04	TRANSISTOR	2N2914
490	14	846-00	TRANSISTOR	2N3904
500	12	846-01	TRANSISTOR	2N3906
510	4	846-08	TRANSISTOR	2N4939
520	4	847-12	TRANSISTOR	2N5516
525	2	847-01	TRANSISTOR SELECTED	9934
528	2	9946-00	TRANSISTOR SELECT	A
530	2	284-01	HEAT SINK	
535	1	848-28	INTEGRATED CIRCUIT	74H11
540	A/R	904-00	SILICONE GREASE	
550	A/R	989-00	WIRE 22 AWG	

TITLE: P.C. ASSY DUAL QMD (.25)
DWG NO. 56855-07 REV ..D..
SHEET..4.OF.5.

PRESTON SCIENTIFIC INC.
PRINTED 01/04/77

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
10	1	56858-00	D&R ASSY DUAL QMD	C
20	16	521-00	RESISTOR 1/4W 10% 22	
30	8	523-00	RESISTOR 1/4W 10% 47	
40	8	525-00	RESISTOR 1/4W 10% 100	
65	2	533-00	RESISTOR 1/4W 10% 2200	
70	8	535-00	RESISTOR 1/4W 10% 3300	
75	1	536-00	RESISTOR 1/4W 10% 4700	
80	16	538-00	RESISTOR 1/4W 10% 10K	
95	2	544-00	RESISTOR 1/4W 10% 47K	
98	2	547-00	RESISTOR 1/4W 10% 100K	
100	4	386-03	RESISTOR 1/8W 1% 402	
130	2	387-07	RESISTOR 1/8W 1% 2490	
140	4	388-02	RESISTOR 1/8W 1% 3740	
150	8	389-01	RESISTOR 1/8W 1% 4990	
170	2	390-03	RESISTOR 1/8W 1% 6040	
180	2	390-04	RESISTOR 1/8W 1% 7500	
185	2	392-00	RESISTOR 1/8W 1% 20K	
190	2	392-01	RESISTOR 1/8W 1% 24.9K	
200	4	393-05	RESISTOR 1/8W 1% 100K	
210	4	488-20	RESISTOR 1/8W 1% 2M	
212	2	440-00	RESISTOR 1/4W 1% 4020	
218	2	451-06	RESISTOR 1/4W 1% 7500	
225	2	561-00	RESISTOR 1/2W 10% 22	
228	1	566-00	RESISTOR 1/2W 10% 150	
230	6	998-25	RESISTOR .02% 3988.4	
235	2	998-30	RESISTOR .02% 3992.4	
245	8	999-83	RESISTOR .02% 25K	
250	4	999-87	RESISTOR .02% 50K	
255	2	374-05	THERMISTOR 10K	
260	2	344-07	POTENTIOMETER 500	
270	4	352-01	POTENTIOMETER 5K	
280	2	351-80	POTENTIOMETER 5K	
285	4	359-03	POTENTIOMETER 10K	
290	4	360-03	POTENTIOMETER 20K	
295	2	47-02	CAPACITOR 2PF	
300	2	48-00	CAPACITOR 3PF	
320	8	52-01	CAPACITOR 5% 10PF	
325	4	56-01	CAPACITOR 5% 30PF	
326	2	61-01	CAPACITOR 10% 100PF	
330	2	77-01	CAPACITOR TRIMMER 9-35PF	
340	3	93-01	CAPACITOR 10% .01UF	
360	4	131-00	CAPACITOR 20% 2.2UF 20V	
365	2	133-00	CAPACITOR 20% 2.2UF 35V	
370	2	142-01	CAPACITOR 10UF 50V	
375	1	144-00	CAPACITOR 20% 22UF 15V	
380	34	239-00	DIODE 1N4148	
385	4	240-80	DIODE ZENER 1N962B	
390	9	248-06	DIODE ZENER 1N5231B	
395	1	248-07	DIODE ZENER 1N5236B	
400	4	248-13	DIODE ZENER 1N5241B	

TITLE: P.C. ASSY DUAL QMD (.25)
DWG NO. 56855-07 REV ..D..
SHEET..5.OF.5.

PRESTON SCIENTIFIC INC.
PRINTED 01/04/77

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
410	2	237-00	DIODE ZENER	1N5242B
420	4	248-12	DIODE ZENER	1N5245B
430	2	247-20	DIODE ZENER	1N5255B
432	6	327-00	TRANSISTOR PAD	
435	6	326-00	TRANSISTOR PAD	
440	1	824-00	TRANSISTOR	2N1132
450	1	828-00	TRANSISTOR	2N1711
460	2	830-02	TRANSISTOR	2N2219A
470	2	838-02	TRANSISTOR	2N2905A
480	2	838-04	TRANSISTOR	2N2914
490	14	846-00	TRANSISTOR	2N3904
500	12	846-01	TRANSISTOR	2N3906
510	4	846-08	TRANSISTOR	2N4939
520	4	847-12	TRANSISTOR	2N5516
525	2	847-01	TRANSISTOR SELECTED	9934
528	2	9946-00	TRANSISTOR SELECT	A
530	2	284-01	HEAT SINK	
535	1	848-28	INTEGRATED CIRCUIT	74H11
540	A/R	904-00	SILICONE GREASE	
550	A/R	989-00	WIRE 22 AWG	

TITLE: P.C. ASSY DUAL GMD (.125) PRESTON SCIENTIFIC INC.
DWG NO. 56855-08 REV ..... B PRINTED 01/04/77
SHEET. 4 OF. 5

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION		
10	1	56858-00	D&R ASSY DUAL GMD		C
20	16	521-00	RESISTOR 1/4W 10%	22	
30	8	523-00	RESISTOR 1/4W 10%	47	
40	8	525-00	RESISTOR 1/4W 10%	100	
65	2	533-00	RESISTOR 1/4W 10%	2200	
70	8	535-00	RESISTOR 1/4W 10%	3300	
75	1	536-00	RESISTOR 1/4W 10%	4700	
80	16	538-00	RESISTOR 1/4W 10%	10K	
95	2	544-00	RESISTOR 1/4W 10%	47K	
98	2	547-00	RESISTOR 1/4W 10%	100K	
100	4	386-03	RESISTOR 1/8W 1%	402	
130	2	387-07	RESISTOR 1/8W 1%	2490	
140	4	388-02	RESISTOR 1/8W 1%	3740	
150	8	389-01	RESISTOR 1/8W 1%	4990	
170	2	390-03	RESISTOR 1/8W 1%	6040	
180	2	390-04	RESISTOR 1/8W 1%	7500	
185	2	392-00	RESISTOR 1/8W 1%	20K	
190	2	392-01	RESISTOR 1/8W 1%	24.9K	
200	4	393-05	RESISTOR 1/8W 1%	100K	
210	4	488-20	RESISTOR 1/8W 1%	2M	
212	2	440-00	RESISTOR 1/4W 1%	4020	
218	2	451-06	RESISTOR 1/4W 1%	7500	
225	2	561-00	RESISTOR 1/2W 10%	22	
228	1	566-00	RESISTOR 1/2W 10%	150	
230	6	998-25	RESISTOR .02%	3988.4	
235	2	998-30	RESISTOR .02%	3992.4	
242	4	999-77	RESISTOR .02%	12.5K	
245	4	999-86	RESISTOR .02%	37.5K	
250	4	999-87	RESISTOR .02%	50K	
255	2	374-05	THERMISTOR	10K	
260	2	344-07	POTENTIOMETER	500	
270	4	352-01	POTENTIOMETER	5K	
280	2	351-80	POTENTIOMETER	5K	
285	4	359-03	POTENTIOMETER	10K	
290	4	360-03	POTENTIOMETER	20K	
295	2	47-02	CAPACITOR	2PF	
300	2	48-00	CAPACITOR	3PF	
320	8	52-01	CAPACITOR 5%	10PF	
325	4	56-01	CAPACITOR 5%	30PF	
326	2	61-01	CAPACITOR 10%	100PF	
330	2	77-01	CAPACITOR TRIMMER	9-35PF	
340	3	93-01	CAPACITOR 10%	.01UF	
360	4	131-00	CAPACITOR 20%	2.2UF 20V	
365	2	133-00	CAPACITOR 20%	2.2UF 35V	
370	2	142-01	CAPACITOR	10UF 50V	
375	1	144-00	CAPACITOR 20%	22UF 15V	
380	34	239-00	DIODE	1N4148	
385	4	240-80	DIODE ZENER	1N962B	
390	9	248-06	DIODE ZENER	1N5231B	
395	1	248-07	DIODE ZENER	1N5236B	

TITLE: P.C. ASSY DUAL GMD (.125) PRESTON SCIENTIFIC INC.
DWG NO. 56855-08 REV ..... B PRINTED 01/04/77
SHEET. 5 OF. 5

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
400	4	248-13	DIODE ZENER	1N5241B
410	2	237-00	DIODE ZENER	1N5242B
420	4	248-12	DIODE ZENER	1N5245B
430	2	247-20	DIODE ZENER	1N5255B
432	6	327-00	TRANSISTOR PAD	
435	6	326-00	TRANSISTOR PAD	
440	1	824-00	TRANSISTOR	2N1132
450	1	828-00	TRANSISTOR	2N1711
460	2	830-02	TRANSISTOR	2N2219A
470	2	838-02	TRANSISTOR	2N2905A
480	2	838-04	TRANSISTOR	2N2914
490	14	846-00	TRANSISTOR	2N3904
500	12	846-01	TRANSISTOR	2N3906
510	4	846-08	TRANSISTOR	2N4939
520	4	847-12	TRANSISTOR	2N5516
525	2	847-01	TRANSISTOR SELECTED	9934
528	2	9946-00	TRANSISTOR SELECT	A
530	2	284-01	HEAT SINK	
535	1	848-28	INTEGRATED CIRCUIT	74H11
540	A/R	904-00	SILICONE GREASE	
550	A/R	989-00	WIRE 22 AWG	

TITLE: P.C. ASSY DUAL GMD (.75) PRESTON SCIENTIFIC INC.
DWG NO. 56855-09 REV ..... D PRINTED 01/04/77
SHEET. 4 OF. 5

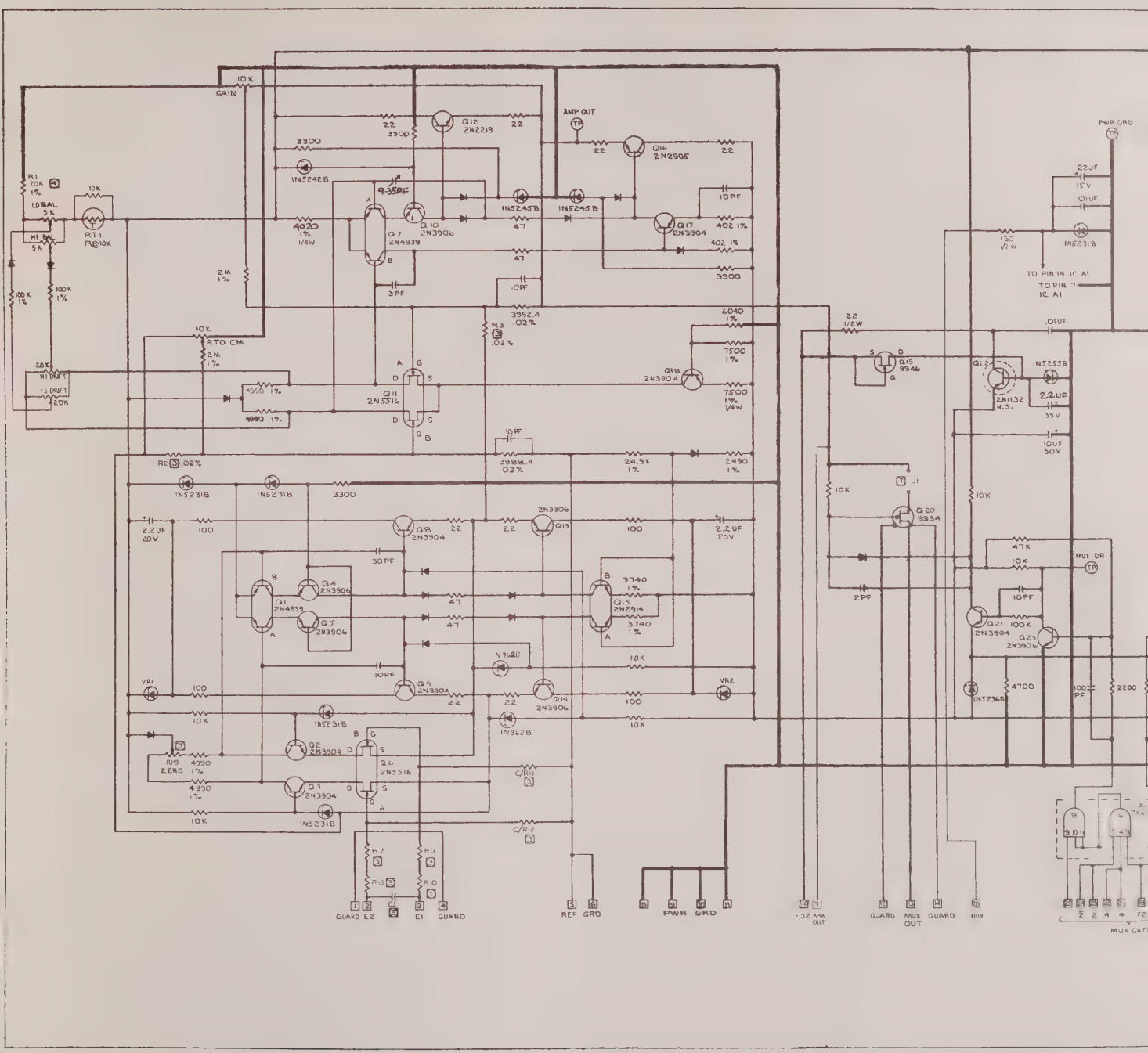
PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION		
10	1	56858-00	D&R ASSY DUAL GMD		C
20	16	521-00	RESISTOR 1/4W 10%	22	
30	8	523-00	RESISTOR 1/4W 10%	47	
40	8	525-00	RESISTOR 1/4W 10%	100	
65	2	533-00	RESISTOR 1/4W 10%	2200	
70	8	535-00	RESISTOR 1/4W 10%	3300	
75	1	536-00	RESISTOR 1/4W 10%	4700	
80	16	538-00	RESISTOR 1/4W 10%	10K	
95	2	544-00	RESISTOR 1/4W 10%	47K	
98	2	547-00	RESISTOR 1/4W 10%	100K	
100	4	386-03	RESISTOR 1/8W 1%	402	
130	2	387-07	RESISTOR 1/8W 1%	2490	
140	4	388-02	RESISTOR 1/8W 1%	3740	
150	8	389-01	RESISTOR 1/8W 1%	4990	
170	2	390-03	RESISTOR 1/8W 1%	6040	
180	2	390-04	RESISTOR 1/8W 1%	7500	
185	2	392-00	RESISTOR 1/8W 1%	20K	
190	2	392-01	RESISTOR 1/8W 1%	24.9K	
200	4	393-05	RESISTOR 1/8W 1%	100K	
210	4	488-20	RESISTOR 1/8W 1%	2M	
212	2	440-00	RESISTOR 1/4W 1%	4020	
218	2	451-06	RESISTOR 1/4W 1%	7500	
225	2	561-00	RESISTOR 1/2W 10%	22	
228	1	566-00	RESISTOR 1/2W 10%	150	
230	6	998-25	RESISTOR .02%	3988.4	
235	2	998-30	RESISTOR .02%	3992.4	
245	4	999-83	RESISTOR .02%	25K	
250	4	999-94	RESISTOR .02%	75K	
255	2	374-05	THERMISTOR	10K	
260	2	344-07	POTENTIOMETER	500	
270	4	352-01	POTENTIOMETER	5K	
280	2	351-80	POTENTIOMETER	5K	
285	4	359-03	POTENTIOMETER	10K	
290	4	360-03	POTENTIOMETER	20K	
295	2	47-02	CAPACITOR	2PF	
300	2	48-00	CAPACITOR	3PF	
320	8	52-01	CAPACITOR 5%	10PF	
325	4	56-01	CAPACITOR 5%	30PF	
326	2	61-01	CAPACITOR 10%	100PF	
330	2	77-01	CAPACITOR TRIMMER	9-35PF	
340	3	93-01	CAPACITOR 10%	.01UF	
360	4	131-00	CAPACITOR 20%	2.2UF 20V	
365	2	133-00	CAPACITOR 20%	2.2UF 35V	
370	2	142-01	CAPACITOR	10UF 50V	
375	1	144-00	CAPACITOR 20%	22UF 15V	
380	34	239-00	DIODE	1N4148	
385	4	240-80	DIODE ZENER	1N962B	
390	9	248-06	DIODE ZENER	1N5231B	
395	1	248-07	DIODE ZENER	1N5236B	
400	4	248-13	DIODE ZENER	1N5241B	

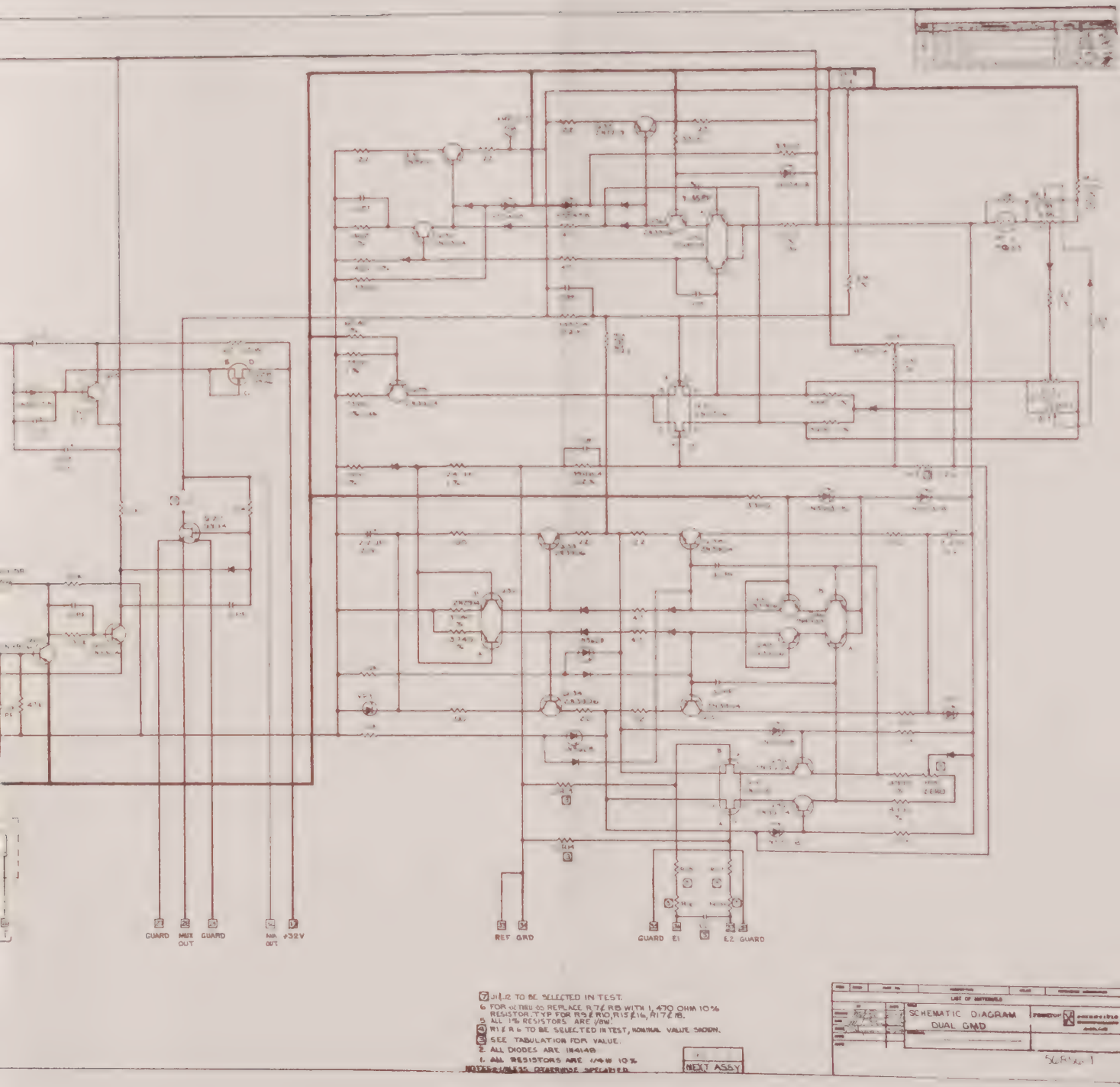
TITLE: P.C. ASSY DUAL GMD (.75) PRESTON SCIENTIFIC INC
DWG NO. 56855-09 REV ..... D PRINTED 01/04/77
SHEET. 5 OF. 5

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION		
410	2	237-00	DIODE ZENER	1N5242B	
420	4	248-12	DIODE ZENER	1N5245B	
430	2	247-20	DIODE ZENER	1N5255B	
432	6	327-00	TRANSISTOR PAD		
435	6	326-00	TRANSISTOR PAD		
440	1	824-00	TRANSISTOR	2N1132	
450	1	828-00	TRANSISTOR	2N1711	
460	2	830-02	TRANSISTOR	2N2219A	
470	2	838-02	TRANSISTOR	2N2905A	
480	2	838-04	TRANSISTOR	2N2914	
490	14	846-00	TRANSISTOR	2N3904	
500	12	846-01	TRANSISTOR	2N3906	
510	4	846-08	TRANSISTOR	2N4939	
520	4	847-12	TRANSISTOR	2N5516	
525	2	847-01	TRANSISTOR SELECTED	9934	
528	2	9946-00	TRANSISTOR SELECT		A
530	2	284-01	HEAT SINK		
535	1	848-28	INTEGRATED CIRCUIT	74H11	
540	A/R	904-00	SILICONE GREASE		
550	A/R	989-00	WIRE 22 AWG		



TABULATION							TAB
DASH NO.	FUNCTION	C1 & C2	R2 & R5	R3 & R4	R7,R9,R15,&R17	R8,R10,R16,&R18	C/R
56855-00	50V.F.S.(.2)	OMIT	1993	1993	45K, 0.02%	45K, 0.02%	
56855-01	100V.F.S. (.1)	OMIT	3988.4	3988.4	45K, 0.02%	45K, 0.02%	
56855-02	5V.F.S. (2)	OMIT	1993	1993	(3) 470, 10%		
56855-03	10V.F.S.(1)	OMIT	3988.4	3988.4	(13) 470, 10%		
56855-04	10V.F.S.(1)	0.01UF	3988.4	3988.4	(13) 470, 10%		22M
56855-05	1.024 V.F.S. (10)	OMIT	398.84	398.84	(13) 470, 10%		
56855-06	20.48V.F.S.(.5)	OMIT	3988.4	3988.4	STRAP	50K	
56855-07	40.96V.F.S.(.25)	OMIT	3988.4	3988.4	25K	50K	
56855-08	81.92V.F.S.(.125)	OMIT	3988.4	3988.4	37.5K	50K	
56855-09	13.653V.F.S. .75	OMIT	3988.4	3988.4	STRAP	25K	



7. J1 & J2 TO BE SELECTED IN TEST.
6. FOR VR THRU 05 REPLACE R7 & R8 WITH 1, 470 OHM 10% RESISTOR. TYP FOR R9 & R10, R15 & 16, R17 & 18.
5. ALL 1% RESISTORS ARE 1/8W.
4. R1 & 6 TO BE SELECTED IN TEST, NOMINAL VALUE SHOWN.
3. SEE TABULATION FOR VALUE.
2. ALL DIODES ARE 1N4148.
1. ALL RESISTORS ARE 1/4W 10%
NOTES: UNLESS OTHERWISE SPECIFIED

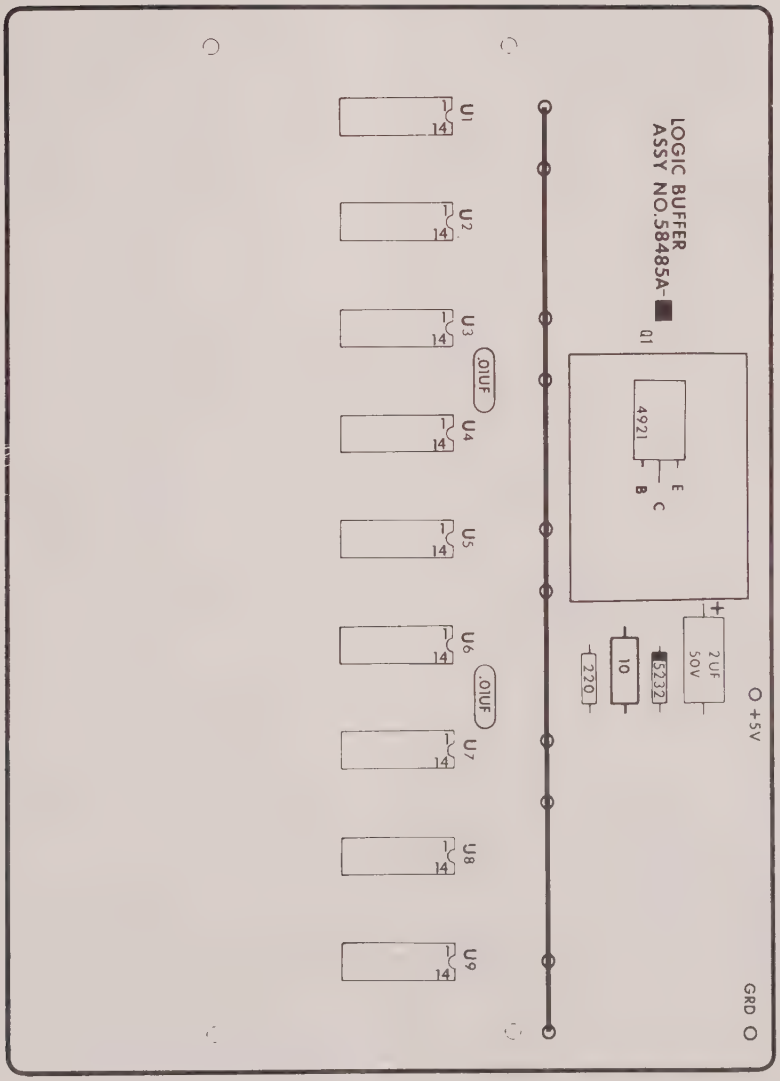
NEXT ASSY

LIST OF MATERIALS

SCHEMATIC DIAGRAM
DUAL GMD

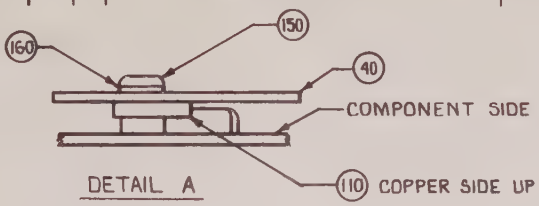
SCALE: 1

ATION		
HRU C/R14	VR1 THRU VR4	R19 & R20
OK	IN5240B	500
OK	IN5240B	500
PF	IN5240B	500
PF	IN5240B	500
/4W, 10%	IN5240B	500
PF	IN5240B	100
OK	IN5241B	500
5K	IN5241B	500
.5K	IN5241B	500
5K	IN5241B	500



DRAWN P.J.BROWN 6-28-78	PRINTED CIRCUIT ASSY		
M.J.STEM 6-28-78	LOGIC BUFFER		
APPD			
ABBREVIATIONS PER MIL STD 12	B	58485-7	58455
SCALE 2/1			

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED
		SEE SHEET ONE		



DETAIL A

5. FOR U1 THRU U9 SEE TABULATION SH 4 OF 4.
4. ALL INTERGRATED CIRCUITS ARE 74H40.
3. FOR HEAT SINK ASSEMBLY SEE DETAIL "A".
2. ALL CAPACITOR VALUES ARE IN UF.
1. FOR SCHEMATIC DIAGRAM SEE DWG. NO. 58486-T.

NOTES: UNLESS OTHERWISE SPECIFIED

BY	DATE
DRAWN B. HEIDEMAN	6-26-73
CHK	6-27-73
ENGR	6-27-73
APPD	
APPD	

TITLE: PRINTED CIRCUIT ASSY LOGIC BUFFER

MATERIAL

FINISH

SCALE

SIZE A

PRESTON
SCIENTIFIC INCORPORATED
803 East Carnicas Ave., Anaheim, Calif. 92805
Tel. (714) 776-6400

58485-T

CODE SH 2 OF 4

NEXT ASSY
58475

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHEET ONE		

TABULATION

DASH NO.	U1	U2	U3	U4	U5	U6	U7	U8	U9
58485-00	74H40	74H40	74H40	74H40	74H40	74H40	74H40	74H40	74H40
-01	↑	↑	↑	↑	↑	↑	74H40	74H90	OMIT
-02	↑	↑	↑	↑	↑	↑	74H90	OMIT	↑
-03	↑	↑	↑	↑	↑	74H90	OMIT	↑	↑
-04	↑	↑	↑	↑	74H40	OMIT	↑	↑	↑
-05	↑	↑	↑	74H40	OMIT	↑	↑	↑	↑
-06	↑	↑	74H40	OMIT	↑	↑	↑	↑	↑
-07	↑	74H40	OMIT	OMIT	↑	↑	↑	↑	↑
-08	74H40	OMIT	OMIT	OMIT	OMIT	OMIT	OMIT	↓	↓
58485-09	74S140	74S140	74S140	74S140	74S140	74S140	74S140	OMIT	OMIT

BY	DATE
DWN H.C. LOTZE	4-8-74
CHK	4-9-74
ENG	4-9-74
APP	

TITLE: PRINTED CIRCUIT ASSY LOGIC BUFFER

MAT'L

FINISH

SIZE A

PRESTON
SCIENTIFIC INCORPORATED
803 East Carnicas Ave. Anaheim Calif. 92803
Tel. (714) 776-6400

58485-T

SCALE SH 4 OF 4

58475
NEXT ASSY

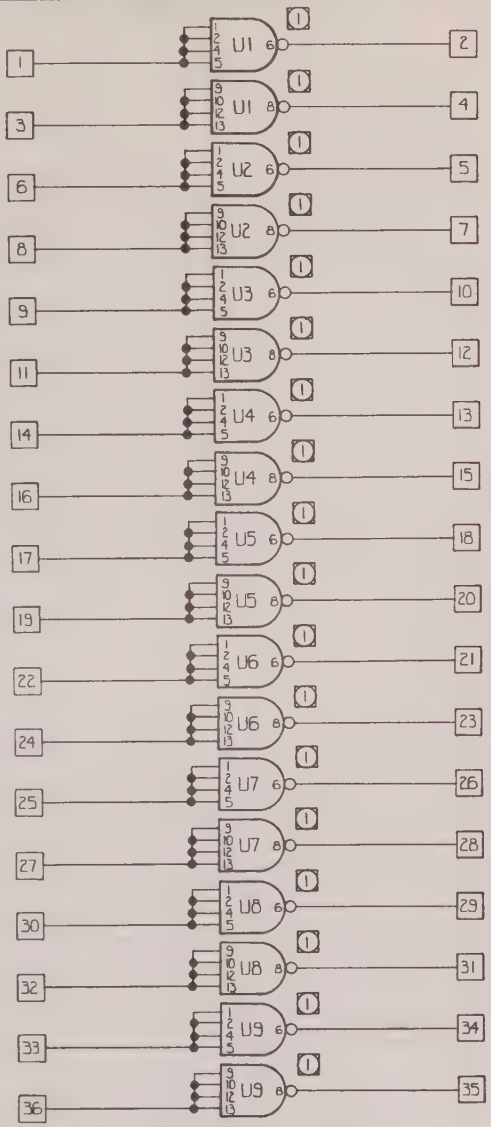
TITLE: P.C. ASSY LOGIC BUFFER A
DWG NO. 58485-00 REV A
SHEET 3 OF 4

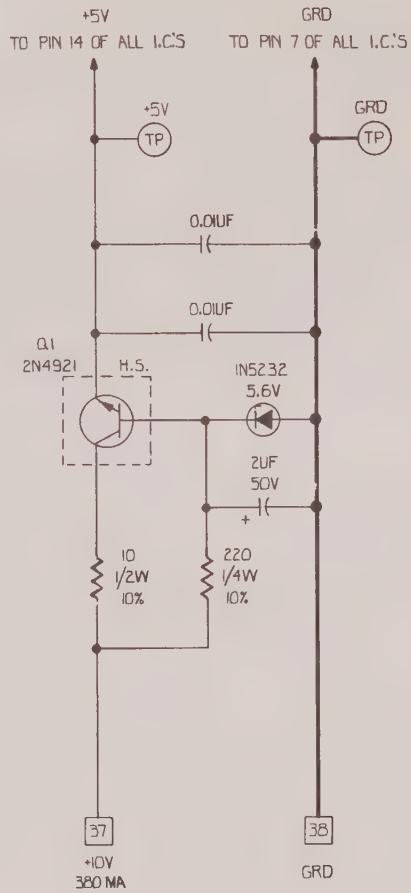
PRESTON SCIENTIFIC INC.
PRINTED 6/28/73

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
010	1	58488-00	D&R ASSY LOGIC BUFFER	C
040	1	46079-00	HEATSINK	A
050	1	527-00	RESISTOR 1/4W 10% 220	
070	1	560-00	RESISTOR 1/2W 10% 10	
080	2	93-01	CAPACITOR 10% .01UF	
090	1	116-00	CAPACITOR 2UF 50V	
100	1	244-08	DIODE ZENER 1N5232B	
110	1	846-03	TRANSISTOR 2N4921	
130	9	848-12	INTEGRATED CIRCUIT 74H40	
150	1	665-00	SCREW PHMS 4-40 X 5/16	
160	1	859-02	WASHER SHOULDER NYLON	

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	E.O. 5589	10-8-75	G.L.B./H.C.L





58486-09	74S140	74S140	74S140	74S140	74S140	74S140	74S140	OMIT	OMIT
58486-08	74H40	OMIT	OMIT	OMIT	OMIT	OMIT	OMIT	↑	↑
58486-07	↑	74H40	OMIT	OMIT	↕	↕	↕		
58486-06		↑	74H40	OMIT					
58486-05			↑	74H40	OMIT	↕			
58486-04				↑	74H40	OMIT	↓		
58486-03					↑	74H40	OMIT	↑	
58486-02						↑	74H40	OMIT	↓
58486-01	↓	↓	↓	↓	↓	↑	74H40	74H40	OMIT
58486-00	74H40	74H40	74H40	74H40	74H40	74H40	74H40	74H40	74H40
DASH NO.	U1	U2	U3	U4	U5	U6	U7	U8	U9

[1] SEE TABULATION.

NOTE: UNLESS OTHERWISE SPECIFIED.

58486-T

UNLESS OTHERWISE SPECIFIED

MECHANICAL DWG TOLERANCES

X ± .030 ANGULAR ± 0° 30'
XX ± .010 63
XXX ± .005 MACH. SURF.
THREADS CLASS 2A OR 2B
REMOVE BURRS & SHARP EDGES .020 MAX.
MACH. FILLET RADIUS .030 R MAX.
MACH. SURF. FLAT WITHIN .003 IN/IN
OTHER SURF. FLAT WITHIN .008 IN/IN

ELECTRICAL DWG DESIGNATIONS

REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.

BY	DATE
DWN B. HEIDEMAN	6-25-73
CHK M.J. STEM	6-28-73
ENG D.L. SYMONS	6-28-73
APP	

58485-T

NEXT ASSY

TITLE: SCHEMATIC DIAGRAM LOGIC BUFFER

MAT'L

FINISH

C SIZE

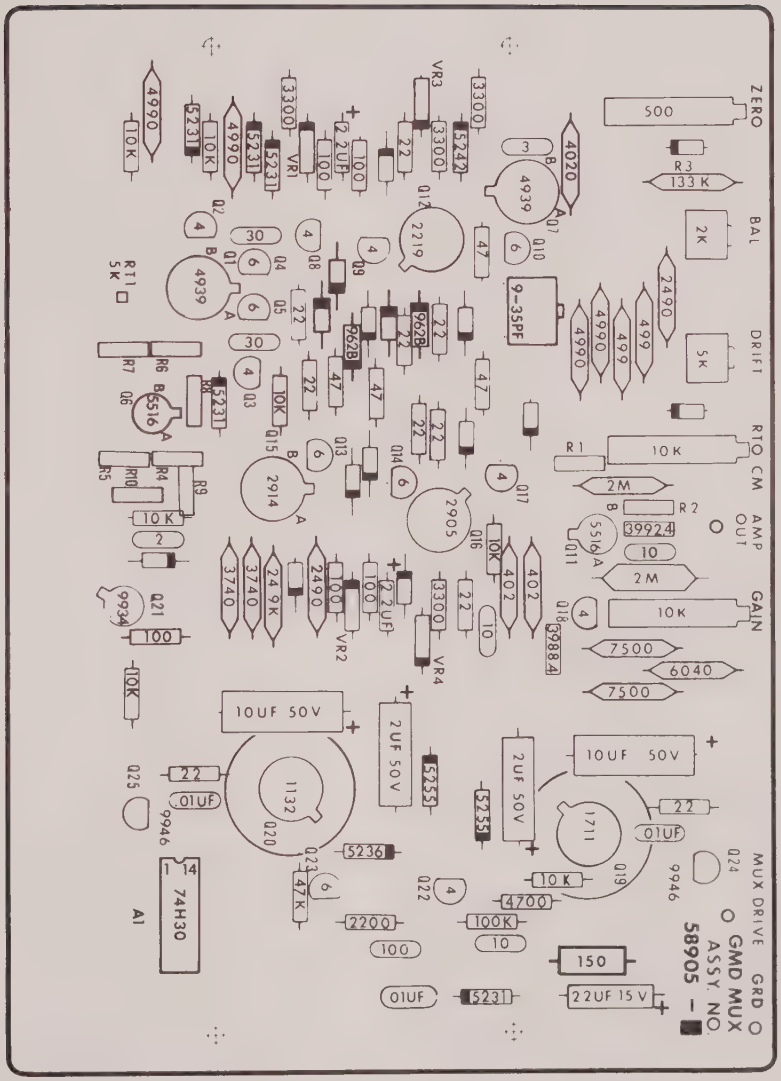
PRESTON

SCIENTIFIC INCORPORATED
803 East Cerritos Ave., Anaheim, Calif. 92805
Tel. (714) 776-6400

58486-T

SCALE

SH 1 OF 1



BY	DATE	TITLE	PRESTON SCIENTIFIC INCORPORATED
DRAWN [signature]	6-17-74	PRINTED CIRCUIT ASSY GMD MUX AMPLIFIER	
CHK M. J. Stein	6-20-74		
ENGR D. L. Symons	6-21-74	MATERIAL	
APPD			
APPD		FINISH	58905-T
ABBREVIATIONS PER MIL-STD-12		SCALE 6/1 — SIZE	CODE — SH 1 OF 4

58845

NEXT ASSY

TABULATION						
DASH NO.	FUNCTION	R1, 0.02%	R2, 0.02%	R8, 0.02%	R9, 0.02%	R10, 0.02%
58905-00	5 V.F.S.	1993	1993	OMIT	OMIT	OMIT
58905-01	10 V.F.S.	3988.4	3988.4	OMIT	OMIT	OMIT
58905-02	10.24 V.F.S.	4084	4084	OMIT	OMIT	OMIT
58905-03	8.192 V.F.S.	3267.2	3267.2	OMIT	OMIT	OMIT
58905-04	2 V.F.S.	3988.4	3988.4	OMIT	OMIT	OMIT
58905-05	20 V.F.S.	3988.4	3988.4	50K	OMIT	OMIT
58905-06	100 V.F.S.	3988.4	3988.4	OMIT	10K	10K

TABULATION								
	VR1 & VR2	VR3 & VR4	R4	R5	R6	R7
-00	IN5240B	IN5234B	(10)	470	(10)	470
-01	IN5240B	IN5245B	(10)	470	(10)	470
-02	IN5241B	IN5245B	(10)	470	(10)	470
-03	IN5239B	IN5245B	(10)	470	(10)	470
-04	IN5240B	IN5226B	(10)	470	(10)	470
-05	IN5240B	IN5245B	STRAP	50K, 0.02%	STRAP	STRAP
-06	IN5240B	IN5245B	45K, 0.02%	45K, 0.02%	45K, 0.02%	45K, 0.02%

(10) FOR -00 THRU -04 REPLACE R4 & R5 WITH 1 (ONE) 470 OHM, 1/4W, 10% RESISTOR. TYP. FOR R6 & R7.

9. INSTALL WIRE (ITEM 550) IN HOLES WITH CIRCUITRY ON COMPONENT SIDE & SOLDER BOTH SIDES WHERE APPLICABLE.
8. INSTALL HEATSINK (ITEM 530) ON TRANSISTOR Q19 & Q20 USING SILICONE GREASE (ITEM 540).
7. R3 NOMINAL VALUE SHOWN, ACTUAL VALUE SELECT IN TEST.
6. FOR R1,R2,R4-R10,AND VR1-VR4 VALUES SEE TABULATION.
5. ALL CAPACITOR VALUES ARE IN PF.
4. ALL DIODES ARE IN4148.
3. ALL RESISTORS ARE 1/4W, 10%.
2. FOR PARTS LIST SEE SHEET 3 & 4 OF 4.
1. FOR SCHEMATIC DIAGRAM SEE DWG. NO. 58906-T.

NOTE: UNLESS OTHERWISE SPECIFIED

PRESTON SCIENTIFIC INCORPORATED Anaheim, Calif.

PRINTED CIRCUIT ASSY GMD MUX AMPLIFIER

58905-T

CODE | SH 2 OF 4

TITLE: P.C. ASSY GMD AMP/MUX NOR IN PRESTON SCIENTIFIC INC.
DWG NO. 58905-01 REV _____ PRINTED 6/20/74
SHEET 3 OF 4

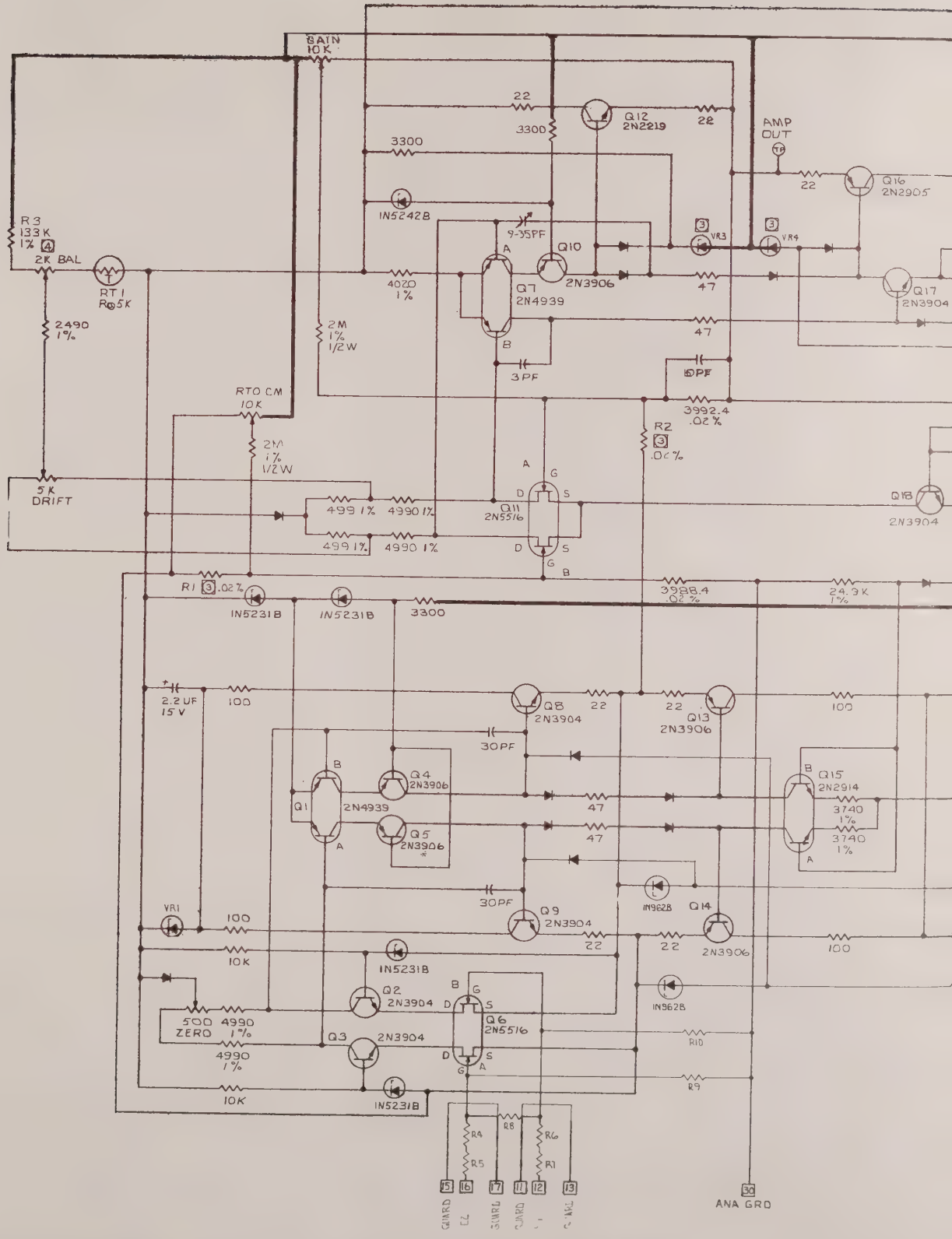
PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
010	1	58908-00	D&R ASSY GMD AMP/MUX NOR IN C
020	10	521-00	RESISTOR 1/4W 10% 22
030	4	523-00	RESISTOR 1/4W 10% 47
040	5	525-00	RESISTOR 1/4W 10% 100
050	2	529-00	RESISTOR 1/4W 10% 470
065	1	533-00	RESISTOR 1/4W 10% 2200
070	4	535-00	RESISTOR 1/4W 10% 3300
075	1	536-00	RESISTOR 1/4W 10% 4700
080	7	538-00	RESISTOR 1/4W 10% 10K
095	1	544-00	RESISTOR 1/4W 10% 47K
098	1	547-00	RESISTOR 1/4W 10% 100K
100	2	401-04	RESISTOR 1/4W 1% 402
110	2	402-02	RESISTOR 1/4W 1% 499
130	2	427-00	RESISTOR 1/4W 1% 2490
140	2	439-01	RESISTOR 1/4W 1% 3740
145	1	440-00	RESISTOR 1/4W 1% 4020
150	4	445-00	RESISTOR 1/4W 1% 4990
170	1	448-00	RESISTOR 1/4W 1% 6040
180	2	451-06	RESISTOR 1/4W 1% 7500
190	1	467-03	RESISTOR 1/4W 1% 24.9K
200	1	478-16	RESISTOR 1/4W 1% 133K
220	2	488-11	RESISTOR 1/2W 1% 2M
228	1	566-00	RESISTOR 1/2W 10% 150
240	3	998-25	RESISTOR .02% 3988.4
250	1	998-30	RESISTOR .02% 3992.4
255	1	374-02	THERMISTOR 5K
260	1	344-07	POTENTIOMETER 500
270	1	346-80	POTENTIOMETER 2K
280	1	351-80	POTENTIOMETER 5K
290	2	359-03	POTENTIOMETER 10K
295	1	47-02	CAPACITOR 2PF
300	1	48-00	CAPACITOR 3PF
320	3	52-01	CAPACITOR 5% 10PF
325	2	56-01	CAPACITOR 5% 30PF
326	2	61-01	CAPACITOR 10% 100PF
330	1	77-01	CAPACITOR TRIMMER 9-35PF
340	3	93-01	CAPACITOR 10% .01UF
350	2	116-00	CAPACITOR 2UF 50V
360	2	131-00	CAPACITOR 20% 2.2UF 20V
370	2	142-01	CAPACITOR 10UF 50V
375	1	144-00	CAPACITOR 20% 22UF 15V
380	15	239-00	DIODE 1N4148
385	2	240-80	DIODE ZENER 1N962B
390	5	248-06	DIODE ZENER 1N5231B
395	1	248-07	DIODE ZENER 1N5236B
400	2	248-10	DIODE ZENER 1N5240B
410	1	237-00	DIODE ZENER 1N5242B
420	2	248-12	DIODE ZENER 1N5245B
430	2	247-20	DIODE ZENER 1N5255B
440	1	824-00	TRANSISTOR 2N1132

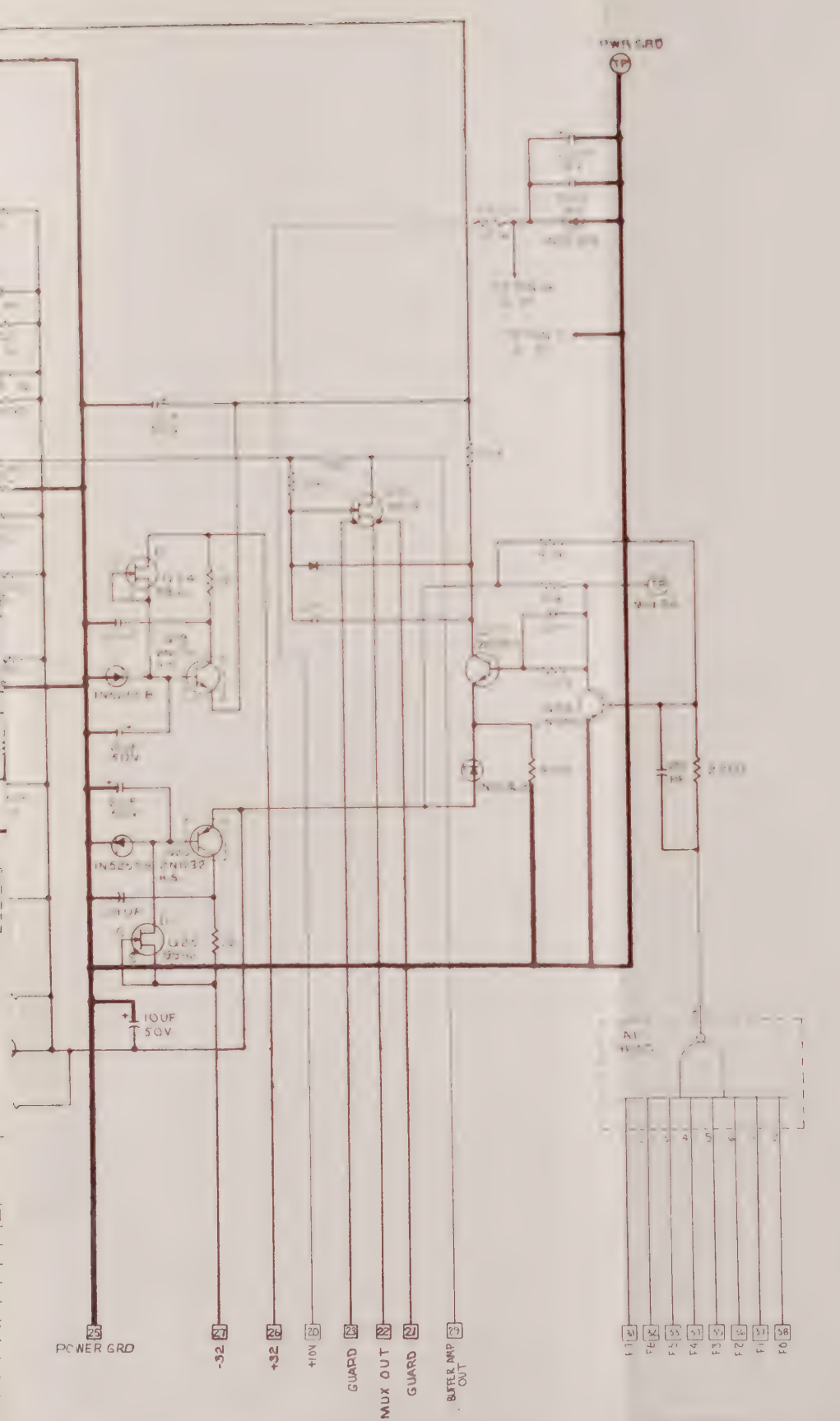
TITLE: P.C. ASSY GMD AMP/MUX NOR IN PRESTON SCIENTIFIC INC.
DWG NO. 58905-01 REV _____ PRINTED 6/20/74
SHEET 4 OF 4

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
450	1	828-00	TRANSISTOR	2N1711
460	1	830-02	TRANSISTOR	2N2219A
470	1	838-02	TRANSISTOR	2N2905A
480	1	838-04	TRANSISTOR	2N2914
490	7	846-00	TRANSISTOR	2N3904
500	6	846-01	TRANSISTOR	2N3906
510	2	846-08	TRANSISTOR	2N4939
520	2	847-12	TRANSISTOR	2N5516
525	1	847-01	TRANSISTOR SELECTED	9934
528	2	9946-00	TRANSISTOR SELECT	A
530	2	284-01	HEAT SINK	
535	1	848 09	INTEGRATED CIRCUIT	74H30
540	A/R	904-00	SILICONE GREASE	
550	A/R	989-00	WIRE 22 AWG	



58906-06	100V.F.S.	3988.4	3988.4	5240	5245	45K,0.02%	45K,0.02%	45K,0.02%			
58906-05	20V.F.S.	3988.4	3988.4	5240	5245	STRAP	50K,0.02%	STRAP	STRAP		
58906-04	2V.F.S.	3988.4	3988.4	5240	5245		4.1K [5]				
58906-03	8.192V.F.S.	3267.3	3267.3	5243	5245						
58906-02	10.24V.F.S.	4084	4084	5241	5245						
58906-01	10V.F.S.	3988.4	3988.4	5240	5245						
58906-00	5V.F.S.	1993	1993	5240	5245						
DWG NO.	FUNCTION	R1	R2	VR1&VR2	VR3&VR4	R3	R4	R5	R6	R7	R8

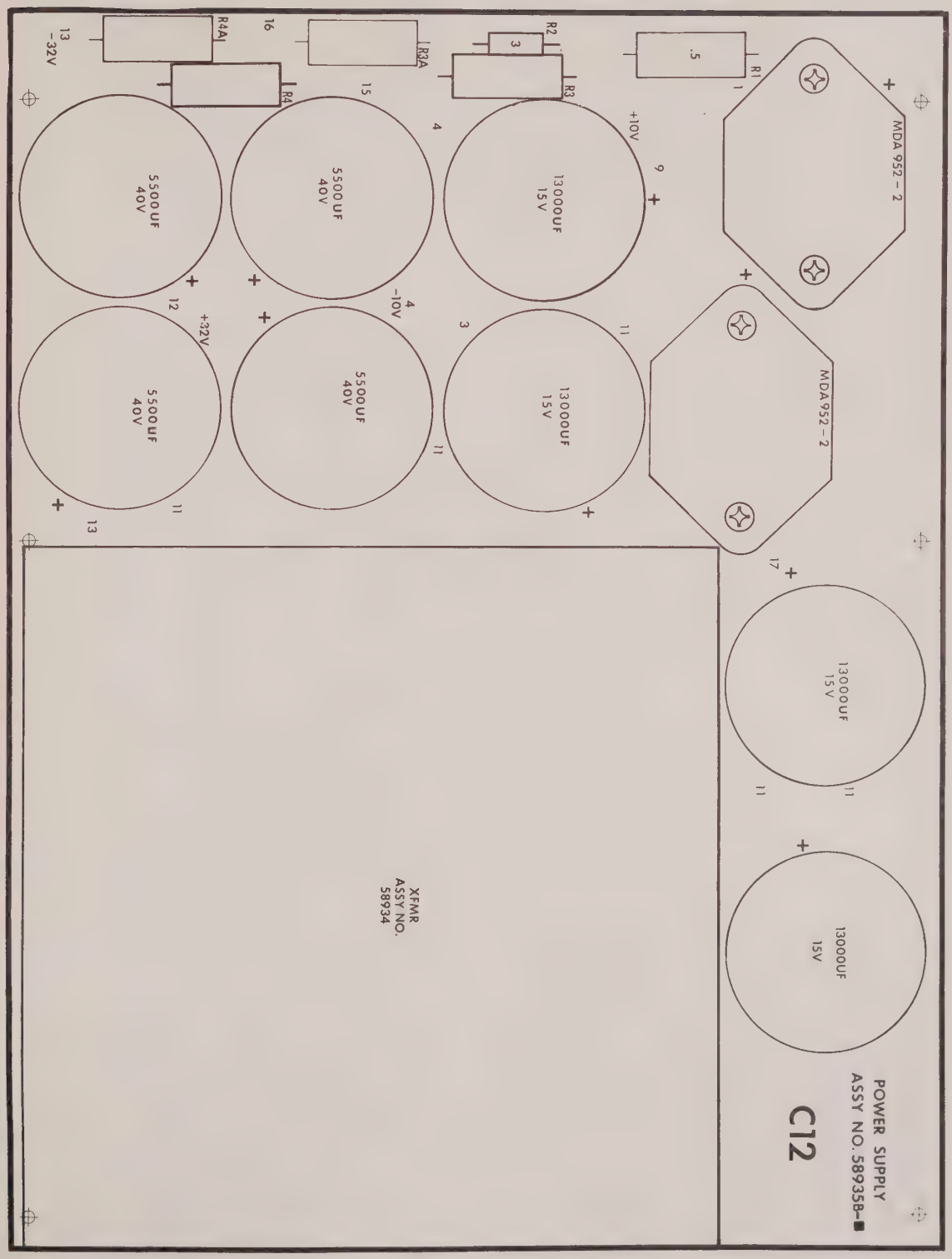


5 FOR -00 THRU-04 REPLACE R4 & R5 WITH 1,470 OHM 1/4W 10% RESITOR. TYP FOR R6&R7.
4 NOMINAL VALUE, TO BE SELECTED IN TEST
3 SEE TABULATION FOR VALUES.
2 ALL DIODES ARE IN4148.
1 ALL RESISTORS ARE 1/4W 10%
NOTES: UNLESS OTHERWISE SPECIFIED

SCHEMATIC DIAGRAM
GMD AMP/MUX WITH NOR INPOT

58905-T
NEXT ASSY

R 58906-T
1 1



58845	B. HEIDEMAN 6-18-74	TITLE P.C. ASSY INTERCONNECT POWER SUPPLY	PRESTON
NEXT ASSY	6-20-74		
	D.I. Lyman 6-21-74	MATERIA	
	APPD		
	APPD	FINISH	C 58935-T
	ABBREVIATIONS PER MIL STD 12	SCALE 2/1	SIZE CODE SH 1 OF 3

REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL
A	E.O. 5836	12-10-76	[illegible]
B	E.O. 5870	3-23-77	[illegible]

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
	SEE SHEET ONE		

58935-01	OMIT
58935-00	0.5 Ω
DASH NO.	R1
TABULATION	

6. FOR PARTS LIST SEE SHEET 3 OF 3.
5. INSTALL THERMOSTAT (ITEM 90) ON BRACKET (ITEM 22) SO THAT THERMOSTAT IS FACING DOWN TOWARD POWER SUPPLY BOARD USING SCREW (ITEM 135), WASHER (ITEM 140), & NUT (ITEM 175).
4. INSTALL BRACKET (ITEM 22) OVER RECTIFIER IN UPPER LEFT CORNER, USING RECTIFIER MOUNTING SCREW (ITEM 130) & WASHER (ITEM 140).
3. INSTALL NUT (ITEM 170) BEFORE MOUNTING XFMR.
2. ALL RESISTORS ARE 1.0, 3W, 5%.
1. FOR SCHEMATIC DIAGRAM SEE DWG. NO. 58936.

NOTE: UNLESS OTHERWISE SPECIFIED.

BY	DATE
DWN B. HEIDEMAN	6-8-74
CHK	6-20-74
ENG	6-27-74
APP	

TITLE: PRINTED CIRCUIT ASSY POWER SUPPLY

MAT'L

FINISH

58845 — NEXT ASSY

A — SIZE

58935-T — SCALE — SH 2 OF 3

PRESTON
SCIENTIFIC INCORPORATED
803 East Cerritos Ave Anaheim Calif 92805
Tel (714) 776-6400

TITLE: P.C. ASSY POWER SUPPLY
DWG NO. 58935-00 REV ..B...
SHEET 3 OF 3

PRESTON SCIENTIFIC INC.
PRINTED 03/24/77

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
10	1	58938-00	D&R ASSY POWER SUPPLY	C
20	1	58934-00	TRANSFORMER ASSY	C
22	1	48229-00	THERMOSTAT BRACKET	A
25	1	558-08	RESISTOR 1/2W 5% 3	
30	1	608-03	RESISTOR 3W 5% .5	
40	4	608-00	RESISTOR 3W 5% 1	
50	4	157-17	CAPACITOR 13000UF 15V	
60	4	157-23	CAPACITOR 5500UF 40V	
80	2	246-01	RECTIFIER BRIDGE MDA952-2	
90	1	800-02	THERMOSTAT	
100	1	863-02	WASHER E.T. #8	
110	4	871-00	WASHER FLAT #8	
130	4	672-00	SCREW PHMS 4-40 X 1	
135	2	663-00	SCREW PHMS 4-40 X 3/16	
140	12	855-00	WASHER FLAT #4 SM	
145	16	864-00	WASHER E.T. # 10	
150	4	874-00	WASHER LOCK #4	
155	2	296-00	NUT LOCK 4-40	
160	4	318-00	NUT 4-40	
165	4	298-00	NUT LOCK 8-32	
170	4	313-00	NUT 8-32	
180	16	724-00	SCREW HEX HD 10-32 X 3/8	

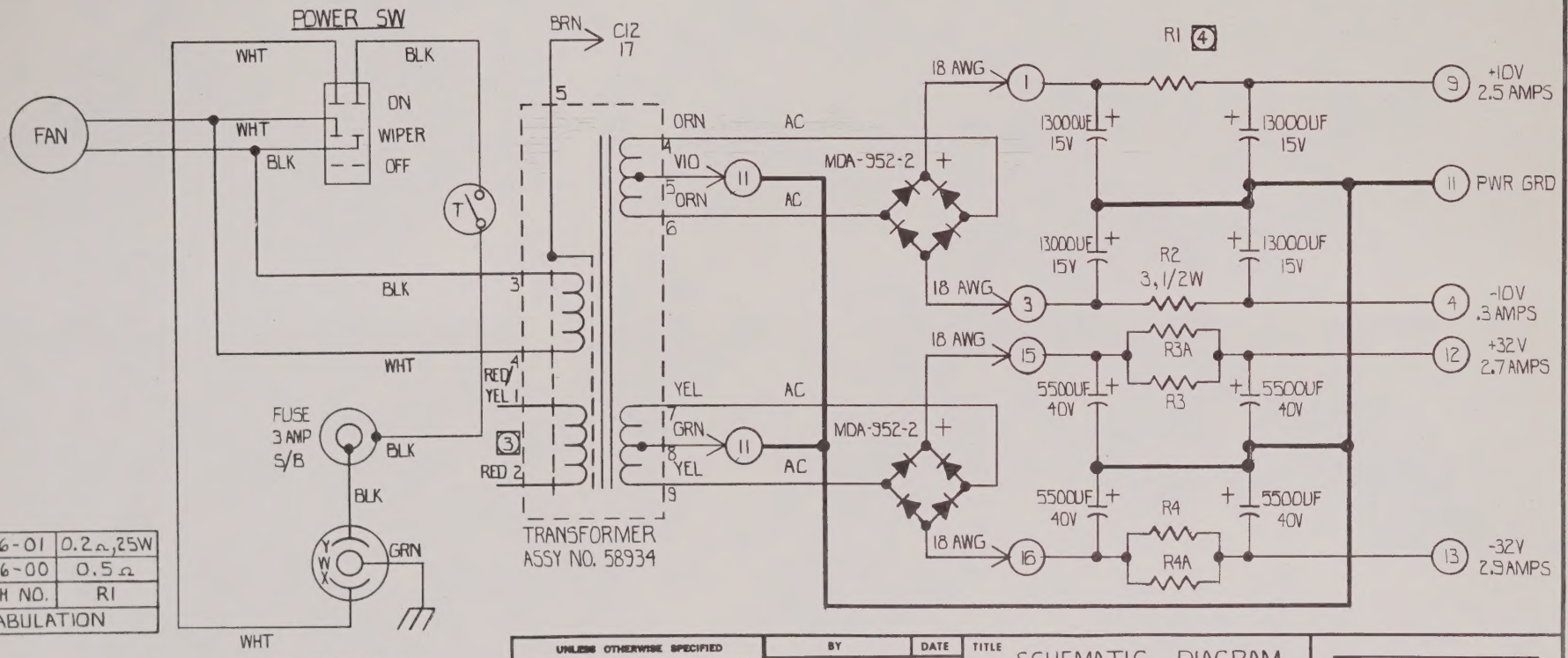
TITLE: P C ASSY POWER SUPPLY
DWG NO. 58935-01 REV ..B..
SHEET 3 OF 3

PRESTON SCIENTIFIC INC
PRINTED 03/24/77

PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION	
10	1	58938-00	D&R ASSY POWER SUPPLY	C
20	1	58934-00	TRANSFORMER ASSY	C
22	1	48229-00	THERMOSTAT BRACKET	A
25	1	558-08	RESISTOR 1/2W 5% 3	
40	4	608-00	RESISTOR 3W 5% 1	
50	4	157-17	CAPACITOR 13000UF 15V	
60	4	157-23	CAPACITOR 5500UF 40V	
80	2	246-01	RECTIFIER BRIDGE MDA952-2	
90	1	800-02	THERMOSTAT	
100	1	863-02	WASHER E.T. #8	
110	4	871-00	WASHER FLAT #8	
130	4	672-00	SCREW PHMS 4-40 X 1	
135	2	663-00	SCREW PHMS 4-40 X 3/16	
140	12	855-00	WASHER FLAT #4 SM	
145	16	864-00	WASHER E.T. # 10	
150	4	874-00	WASHER LOCK #4	
155	2	296-00	NUT LOCK 4-40	
160	4	318-00	NUT 4-40	
165	4	298-00	NUT LOCK 8-32	
170	4	313-00	NUT 8-32	
180	16	724-00	SCREW HEX HD 10-32 X 3/8	

REVISIONS			
SYM	DESCRIPTION	DATE	APPROVAL
A	E.O. 5836	12-10-76	
B	E.O. 5870	3-23-77	



58936-01	0.2Ω, 25W
58936-00	0.5Ω
DASH NO.	RI
TABULATION	

4 SEE TABULATION.
3 CAP LEADS WITH THERMOFIT.
2. ALL WIRES ARE 22 AWG.
1. ALL RESISTORS ARE 1.0, 3W, 5%.
NOTE: UNLESS OTHERWISE SPECIFIED.

UNLESS OTHERWISE SPECIFIED

MECHANICAL DWG TOLERANCES

X ± .050 ANGULAR ± 0° 30'
.XX ± .010
.XXX ± .005 MACH. SURF. 63
THREADS CLASS 2A OR 2B
REMOVE BURRS & SHARP EDGES .030 MAX.
MACH. FILLET RADIUS .030 R MAX.
MACH. SURF. FLAT WITHIN .001 IN/IN
OTHER SURF. FLAT WITHIN .005 IN/IN

ELECTRICAL DWG DESIGNATIONS

REFERENCE DESIGNATIONS ARE ABBREVIATED. PREFIX THE DESIGNATION WITH UNIT NUMBER OR ASSEMBLY DESIGNATION OR BOTH.

	BY	DATE
DWN	B. HEIDEMAN	6-15-74
CHK		6-20-74
ENG		6-21-74
APP		

58935-T
NEXT ASSY

TITLE
SCHEMATIC DIAGRAM
INTERCONNECT PWR SUPPLY

MAT'L

FINISH

B
SIZE

PRESTON
SCIENTIFIC INCORPORATED
805 East Cerritos Ave., Anaheim, Calif. 92805
Tel. (714) 776-6400

58936-T

SCALE

SH 1 OF 1